Graduate School Form 30
Updated 1/15/2015

PURDUE UNIVERSITY
GRADUATE SCHOOL
Thesis/Dissertation Acceptance

This is to certify that the thesis/dissertation prepared

By Shannon Christy

Entitled

RELATIONSHIPS BETWEEN MASCULINITY BELIEFS AND COLORECTAL CANCER SCREENING IN MALE VETERANS

For the degree of Doctor of Philosophy

Is approved by the final examining committee:

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RELATIONSHIPS BETWEEN MASCULINITY BELIEFS AND COLORECTAL CANCER SCREENING IN MALE VETERANS

A Dissertation

Submitted to the Faculty

of

Purdue University

by

Shannon M. Christy

In Partial Fulfillment of the

Requirements for the Degree

of

Doctor of Philosophy

August 2015

Purdue University

Indianapolis, Indiana

For RPC and JAC

ACKNOWLEDGEMENTS

I wish to express my sincere gratitude to a number of individuals for their mentorship, time, and support throughout the process of completing my dissertation study and doctorate. I have been fortunate to have two gifted and generous mentors who provided me with excellent professional development opportunities throughout my doctoral program. First, I owe much gratitude to Catherine E. Mosher, PhD, my advisor and dissertation committee chair, for her superb mentorship as I completed my dissertation and the requirements for my degree. Second, I wish to thank Susan M. Rawl, PhD, RN, FAAN for her excellent mentorship and expertise in colorectal cancer screening over the past several years. Third, I also want to thank David Haggstrom, MD, MAS and Kevin Rand, PhD for their time and guidance throughout my dissertation study. Next, many thanks are due to Leah Van Antwerp for her time and energy while she served as a research assistant on the study. Additionally, I wish to thank Victoria L. Champion, PhD, RN, FAAN and the National Cancer Institute-funded R25 program for excellent predoctoral fellowship opportunities. Furthermore, I wish to acknowledge the funding sources for this dissertation study: the National Cancer Institute (R25-CA117865), the American Psychological Association of Graduate Students, and the IUPUI Department of Psychology. I also want to thank the study participants for their time. In addition, I wish to recognize my friends and family for their support and patience

as I completed my dissertation and doctoral degree. Finally, I must express my unending gratitude to the following people for their love and support throughout this process: TB, RPC, and JAC.

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ABSTRACT

Christy, Shannon M., Ph.D., Purdue University, August 2015. Relationships Between Masculinity Beliefs and Colorectal Cancer Screening in Male Veterans. Major Professor: Catherine E. Mosher.

Colorectal cancer (CRC) is the third most common cancer diagnosed and the third most common cause of cancer deaths among men in the United States. Although CRC screening tests can reduce CRC incidence and mortality, men's current rates of CRC screening fall below screening objectives. Results from qualitative studies have suggested masculinity to be a potential barrier to CRC screening as some men may find endoscopic screening procedures to breach masculinity norms. In prior studies, masculinity beliefs have been associated with preventive health behaviors as well as risk behaviors among men. However, to the author's knowledge, no other quantitative studies have examined the relationship between masculinity and CRC screening adherence. The current study aimed to understand the relationship between three aspects of masculinity (i.e., self-reliance, risk-taking, and heterosexual self-presentation), health beliefs, participant characteristics, and CRC screening adherence. It was hypothesized that the three aspects of masculinity would be inversely associated with CRC screening adherence. Data were collected from 350 men aged 51-75 at average risk for CRC who were accessing primary care services at a Veterans Affairs Medical Center. Of the 350 consenting individuals,

data from 327 participants were included in study analyses. Of those 327 participants, 213 individuals were adherent to CRC screening guidelines and the remaining 114 were non-adherent. Correlational and logistic regression analyses were utilized to examine associations between aspects of masculinity and CRC screening adherence. Conditional process analyses were used to examine whether health belief variables (i.e., trust in physician and cancer fear) mediated the relationships between certain aspects of masculinity and CRC screening adherence. Next, participant characteristics (i.e., race, age, and length of relationship between the patient and his primary care provider) were examined as potential moderators of certain relationships in the models utilizing conditional process analyses. In addition, a hierarchical logistic regression analysis was utilized to examine whether the three aspects of masculinity predicted CRC screening adherence above and beyond the predictive value of variables that have predicted CRC screening adherence in prior studies (i.e., race, age, education, physician recommending CRC screening, and family/friend recommending CRC screening). Furthermore, logistic regression analyses were used to examine the extent to which the three aspects of masculinity predicted the receipt of stool blood testing and endoscopic screening. Results suggested that none of the three masculinity variables were significantly associated with CRC screening adherence. In addition, health beliefs did not mediate the proposed relationships between aspects of masculinity and CRC screening adherence, and participant characteristics did not moderate relations between certain mediators and outcome variables. Potential explanations for study results and future directions are

discussed. Prospective and longitudinal research studies that recruit participants from diverse backgrounds are required to better understand relationships among study variables.

BACKGROUND

Introduction

Men's adherence to masculinity norms has been implicated as a risk factor for unhealthy behaviors (e.g., drinking to intoxication, having unprotected sex with multiple, simultaneous partners) and lack of engagement in healthy behaviors (e.g., blood pressure screening, cholesterol screening, wearing protective clothing while in the sun, receipt of annual medical and dental exams) (Boman & Walker, 2010; Courtenay, 2000a, 2000b, 2011; Hammond, Matthews, & Corbie-Smith, 2010; Iwamoto, Cheng, Lee, Takamatsu, & Gordon, 2011; Locke & Mahalik, 2005; Mahalik, Lagan, & Morrison, 2006; Mahalik et al., 2003; Nicholas, 2000; Pachankis, Westmaas, & Dougherty, 2011; Pleck, Sonenstein, & Ku, 1993; Wade, 2009). Masculinity has been defined as behaviors, beliefs, and personality characteristics associated more often with men than women as well as characteristics and behaviors that society prescribes and reinforces in men (Thompson, Pleck, & Ferrera, 1992). Rooted in geographical, cultural, and temporal environments, diverse masculinities have emerged throughout the United States and the world (Connell, 1995; Courtenay, 2011). Traditional masculinity beliefs and behaviors in the United States include *the sturdy oak* (men should be tough, self-reliant, stoic, and confident), *no sissy stuff* (men should avoid feminine characteristics and behaviors), *the*

big wheel (men should strive for success and status), and *give 'em hell* (men should embrace aggressiveness, daring, and violence) (Brannon, 1976).

Numerous qualitative studies have suggested that some men find cancer screening examinations involving the rectum (i.e., endoscopy for colorectal cancer [CRC] screening or digital rectal examination [DRE] for prostate cancer screening) an affront to their masculinity (see Table 1 for quotations from these studies) (Bass et al., 2011; Beeker, Kraft, Southwell, & Jorgensen, 2000; Getrich et al., 2012; Goldman, Diaz, & Kim, 2009; Harvey & Alston, 2011; Holt et al., 2009; Jilcott Pitts et al., 2013; Jones, Devers, Kuzel, & Woolf, 2010; Rivera-Ramos & Buki, 2011; Thompson, Reeder, & Abel, 2011; Wackerbarth, Peters, & Haist, 2005; Winterich et al., 2009). However, to the author's knowledge, no quantitative studies have considered the role of masculinity in CRC screening adherence. Unfortunately, current CRC screening rates fall below the 70.5% Healthy People 2020 screening objective (U.S. Department of Health and Human Services, 2012).

Research is needed to better understand relationships between men's masculinity norms and CRC screening adherence so that interventions may be developed to reduce barriers to screening, improve screening rates, and, ultimately, decrease men's mortality from CRC. The present study will address this gap in the literature by examining the masculinity norms and CRC screening adherence of male veterans aged 51-75 years who are at average CRC risk (Levin et al., 2008). First, the prevalence of CRC, its risk factors and warning signs as well as CRC screening techniques, screening rates, and characteristics of individuals who are adherent and non-adherent to CRC screening guidelines are summarized. Next, the concept of masculinity, theoretical and empirical

support for studying masculinity norms within the context of CRC screening, and potential relationships between masculinity norms and colorectal cancer screening behaviors are described. Finally, the study methods, results, and future directions and limitations of this research are described.

Colorectal Cancer: Prevalence, Risk Factors, and Warning Signs

As the third most common cancer diagnosed and the third most common cause of cancer deaths among men in the United States, CRC represents a significant public health issue (American Cancer Society, 2014a, 2014b). Compared to women, men are at higher risk of being diagnosed with CRC and dying from CRC (Howlader et al., 2011). From 2007-2011, 50.6 per 100,000 men received a CRC diagnosis per year and 19.6 per 100,000 men died from CRC per year, whereas 38.2 per 100,000 women received a CRC diagnosis per year and 13.9 per 100,000 women died from CRC per year (National Cancer Institute, 2014). Unfortunately, 60% of CRC cases are diagnosed at an advanced stage (American Cancer Society, 2011, 2014a). It is projected that 132,700 individuals in the United States will receive a CRC diagnosis (69,090 men and 63,610 women), and 49,700 individuals will die from colon or rectal cancers (26,100 men and 23,600 women) in 2015 (American Cancer Society, 2015).

A number of risk factors for CRC have been identified (National Cancer Institute, 2012b). Unmodifiable risk factors for CRC include age, family history of CRC, personal history of precancerous colon polyps, and certain medical conditions (e.g., ulcerative colitis, Crohn's disease, CRC-linked hereditary syndromes) (National Cancer Institute, 2012b). Modifiable risk factors for the disease include obesity, smoking, greater alcohol

intake, lack of physical activity, poor diet, and failure to undergo CRC screening (National Cancer Institute, 2012b).

A variety of symptoms may be indicative of CRC (National Cancer Institute, 2012a, 2012c). Although many cases of CRC are asymptomatic, when present, common CRC symptoms include blood in the stool, abdominal pain or bloating, narrowing of stool, constipation, diarrhea, tenesmus (the sensation that one cannot completely empty one's bowels), or other changes in bowel habits (National Cancer Institute, 2012a, 2012c). Other symptoms of CRC include fatigue, vomiting, sudden, unintentional weight loss, and a change in one's appetite (National Cancer Institute, 2012a, 2012c).

Screening for Colorectal Cancer

Adherence to CRC screening guidelines by eligible U.S. adults has the potential to reduce mortality from the disease by approximately half (Brenner, Chang-Claude, Seiler, Rickert, & Hoffmeister, 2011; Cafferty, Sasieni, & Duffy, 2009; Citarda, Tomaselli, Capocaccia, Barcherini, & Crespi, 2001; Edwards et al., 2010; Levin et al., 2008; National Cancer Institute, 2000; Thiis-Evensen et al., 1999; Winawer et al., 1997). Tests used to identify CRC include colonoscopy, fecal occult blood test (FOBT), fecal immunochemical test (FIT), barium enema, flexible sigmoidoscopy, DRE, virtual colonoscopy, biopsy, or carcinoembryonic antigen (CEA) assay, a blood test to detect a CRC-associated antigen (National Cancer Institute, 2012a, 2012c). CRC is highly curable when detected early (American Cancer Society, 2012b; National Cancer Institute, 2012d). In addition, some CRC screening methods can remove precancerous colon polyps before they develop into CRC, thereby decreasing incidence and mortality from

this disease (American Cancer Society, 2012b; Brenner et al., 2011; Cafferty et al., 2009; Citarda et al., 2001; Edwards et al., 2010; Levin et al., 2008; National Cancer Institute, 2000, 2012d; Thiis-Evensen et al., 1999; Winawer et al., 1997).

Recommended CRC screening methods vary according to one's risk factors for the disease. These risk factors include increasing age, family history of CRC, a history of colon polyps, genetic syndromes (e.g., familial adenomatous polyposis, Lynch syndrome), and certain medical conditions (e.g., ulcerative colitis, Crohn's disease) (Levin et al., 2008). Individuals who lack risk factors other than age are at average risk for CRC (Levin et al., 2008). For these individuals, screening begins at age 50 and includes the following six options: (1) single-strand DNA (frequency not specified); (2) FOBT or FIT each year; (3) flexible sigmoidoscopy every five years; (4) double-contrast barium enema every five years; (5) virtual colonoscopy every five years; or (6) colonoscopy every ten years (Levin et al., 2008; Smith, Cokkinides, Brooks, Saslow, & Brawley, 2010). Among individuals at increased risk for CRC, colonoscopy is recommended for CRC surveillance and this test may begin prior to age 50 (Smith et al., 2010). Despite a range of CRC screening options for average-risk individuals, only 60.2% of American men aged 50 or older are adherent to current CRC screening recommendations (American Cancer Society, 2014b).

Characteristics Associated with Colorectal Cancer Screening Adherence and Non-adherence

A number of demographic, personal health, and clinical variables have been associated with CRC screening in men and women (Beydoun & Beydoun, 2008; Brouse,

Wolf, & Basch, 2008; Centers for Disease Control and Prevention, 2012b; Farmer, Bastani, Kwan, Belman, & Ganz, 2008; Friedman, Webb, & Everett, 2004; Guessous et al., 2010; Honda, 2004; Jandorf et al., 2010; Kremers, Mesters, Pladdet, van den Borne, & Stockbrugger, 2000; Post et al., 2008; Tabbarah, Nowalk, Raymund, Jewell, & Zimmerman, 2005; Tessaro, Mangone, Parkar, & Pawar, 2006; Vernon, 1997; Ziegler, Schubring-Giese, Buhner, & Kolligs, 2010). Prior research has consistently found that White race and older age (65 years and older) predict CRC screening (Centers for Disease Control and Prevention, 2012b). Additional predictors of CRC screening adherence include male gender, greater income, higher educational attainment, health insurance coverage, being married, physician recommendation, a family history of CRC, perceived family/friend support for CRC screening, adherence to other cancer screening guidelines and health protective behaviors, more frequent health care visits, and a preventive health orientation (Beydoun & Beydoun, 2008; Brouse et al., 2008; Centers for Disease Control and Prevention, 2012b; Farmer et al., 2008; Friedman et al., 2004; Guessous et al., 2010; Honda, 2004; Jandorf et al., 2010; Kremers et al., 2000; Post et al., 2008; Tabbarah et al., 2005; Tessaro et al., 2006; Vernon, 1997; Ziegler et al., 2010). Mixed associations have been obtained between medical co-morbidities and CRC screening (Fleming, Schoenberg, Tarasenko, & Pearce, 2011; Lukin et al., 2012). Although male gender has predicted CRC screening in prior studies, researchers have found that men's self-reported colonoscopy rates were inflated and that over-reporting of colonoscopy by men may in fact account for the gender differences in CRC screening rates found in these studies (Griffin et al., 2009).

Cognitive variables also have been predictive of CRC screening behavior. For example, perceived risk of CRC and self-efficacy for CRC screening test completion have been positively associated with CRC screening adherence (Halbert et al., 2011; Kremers et al., 2000; Myers et al., 1994; Tessaro et al., 2006). However, the relationship between perceived risk of CRC and CRC screening has been inconsistent (Manne et al., 2003). Lack of knowledge of both CRC and CRC screening also has been associated with decreased CRC screening (Beeker et al., 2000; Berkowitz, Hawkins, Peipins, White, & Nadel, 2008; Friedemann-Sanchez, Griffin, & Partin, 2007; Jones, Devers, et al., 2010; Jones, Woolf, et al., 2010; O'Malley, Beaton, Yabroff, Abramson, & Mandelblatt, 2004). In addition, CRC test requirements (e.g., collecting stool samples, test preparation for endoscopy, including food restriction and consuming the preparation laxative) have been noted as perceived barriers to CRC screening (Beeker et al., 2000; Denberg et al., 2005; Jones, Devers, et al., 2010). Low health literacy, greater cancer fatalism, and lack of trust in one's physician also have been associated with decreased CRC screening adherence (Jones, Devers, et al., 2010; O'Malley et al., 2004; Shelton, Jandorf, Ellison, Villagra, & DuHamel, 2011).

A growing body of research has examined the role of affect and emotions in CRC screening behavior (Consedine, Magai, Krivoshekova, Ryzewicz, & Neugut, 2004; Consedine, Reddig, Ladwig, & Broadbent, 2011; Manne et al., 2003; Paddison & Yip, 2010; Power et al., 2008; Rawl, Menon, Champion, Foster, & Skinner, 2000; Robinson et al., 2011; Sandberg & Conner, 2009; Waller, Bartoszek, Marlow, & Wardle, 2009). Fear of cancer and fear of pain related to screening have been inversely related to CRC screening (Farraye et al., 2004; Feeley, Cooper, Foels, & Mahoney, 2009; Friedemann-

Sanchez et al., 2007; Jandorf et al., 2010; Jones, Devers, et al., 2010; Weinberg, Turner, Wang, Myers, & Miller, 2004). In addition, concern about one's body being exposed to others and negative attitudes toward CRC screening tests and test preparation have been found to be negatively associated with screening (Beeker et al., 2000; Denberg et al., 2005; Farraye et al., 2004; Feeley et al., 2009; Friedemann-Sanchez et al., 2007; Janz, Wren, Schottenfeld, & Guire, 2003; Jones, Devers, et al., 2010; Jones, Woolf, et al., 2010). Greater embarrassment has been consistently associated with both lower stage of readiness to complete CRC screening and decreased CRC screening behaviors (Consedine, Ladwig, Reddig, & Broadbent, 2011; Paddison & Yip, 2010; Rawl et al., 2000). On the other hand, anticipated regret (i.e., regret if one were to forgo CRC screening and later developed CRC) and cancer-related worry have been positively related to intentions to complete CRC screening (Brenes & Paskett, 2000; Ferrer et al., 2011; Power et al., 2008; Wardle et al., 2000). Whereas anticipated regret has been unrelated to CRC screening behavior (Power et al., 2008), cancer-related worry has shown negative associations with this behavior (Robinson et al., 2011).

Although researchers have identified demographic, cognitive, and affective factors as predictors of CRC screening behavior, these studies have failed to examine the potential role of masculinity norms in men's screening behavior. Although not yet tested, a conceptual framework which integrates previously demonstrated predictors of CRC screening behavior (e.g., demographics, cognitions, emotions), physician and systems-level characteristics, and aspects of masculinity and gender role beliefs has been created (Christy, Mosher, & Rawl, 2014). Even though qualitative studies have shown that some men believe that cancer screening involving the rectum violates masculinity norms (Bass

et al., 2011; Beeker et al., 2000; Getrich et al., 2012; Goldman et al., 2009; Harvey & Alston, 2011; Holt et al., 2009; Jilcott Pitts et al., 2013; Jones, Devers, et al., 2010; Rivera-Ramos & Buki, 2011; Thompson et al., 2011; Wackerbarth et al., 2005; Winterich et al., 2009), to the author's knowledge, no quantitative examination of the role of masculinity norms in CRC screening adherence has been conducted.

Masculinity

Masculinity has been conceptualized as male characteristics based on commonly found differences between males and females as well as the characteristics that society imposes and emphasizes in males (Thompson et al., 1992). In the United States, there are various types of masculinities that are adopted by diverse groups of men (e.g., based upon sexual orientation, geographic region, race, socioeconomic status, time period) (Campbell & Bell, 2000; Courtenay, 2011; Levant, Majors, & Kelley, 1998). However, most American conceptualizations of traditional masculinity norms include the following ideals: emotional control, non-relational attitudes toward sexuality, power over women, winning, dominance, primacy of work, avoidance of femininity, pursuit of status, violence/aggression, risk-taking, self-reliance, and disdain for gay individuals (or heterosexual self-presentation) (Brannon, 1976; Mahalik et al., 2003; Parent & Moradi, 2009; Walker, Tokar, & Fischer, 2000). Gender role conflict (or stress) occurs when a man who holds masculinity beliefs is confronted by a situation in which those masculinity beliefs are or may be breached (Eisler, Skidmore, & Ward, 1988; O'Neil, 2008). Gender role conflict and adherence to masculinity norms have been found to vary as a function of race and socioeconomic status (SES) (Abreu, Goodyear, Campos, &

Newcomb, 2000; Connell, 1995; Courtenay, 2011; Courtenay, 2000a; Jakupcak, Lisak, & Roemer, 2002; Levant & Majors, 1997; Levant et al., 1998; Levant et al., 2003; Mahalik et al., 2003; Norwalk, Vandiver, White, & Englar-Carlson, 2011; Stillson, O'Neil, & Owen, 1991). Specifically, African-American and Hispanic men generally have reported higher levels of gender role conflict and traditional masculinity norms compared to Caucasian men (Abreu et al., 2000; Levant & Majors, 1997; Levant et al., 1998; Norwalk et al., 2011). In addition, men from lower SES backgrounds are more likely than those of higher SES to adhere to traditional masculinity norms and experience gender role conflict (Connell, 1995; Courtenay, 2000a, 2011; Mahalik et al., 2003; Stillson et al., 1991).

Masculinity beliefs have been predictive of perceived barriers to health care use and degree of engagement in health-promoting behaviors (Boman & Walker, 2010; Courtenay, 2000a, 2000b, 2011; Mahalik & Burns, 2011; Mahalik, Burns, & Syzdek, 2007; Nicholas, 2000; Pleck et al., 1993; Springer & Mouzon, 2011). Men who endorse higher levels of masculinity have been found to be less likely to engage in preventive health care (e.g., prostate cancer examination, flu shot) compared to men with moderate levels of masculinity (Springer & Mouzon, 2011). In addition, endorsement of masculinity norms, coupled with higher levels of perceived barriers to performance of heart-healthy behaviors (e.g., healthy diet, regular exercise, medical check-ups and tests), have been associated with decreased likelihood of performing these behaviors (Mahalik & Burns, 2011).

Evidence for the Role of Masculinity in CRC Screening

Although no known quantitative research has been conducted to examine the relationship between masculinity norms and CRC screening adherence, qualitative evidence supports the possibility that adherence to masculinity norms may influence some men's willingness to undergo endoscopic CRC screening (see Table 1) (Bass et al., 2011; Beeker et al., 2000; Getrich et al., 2012; Goldman et al., 2009; Harvey & Alston, 2011; Holt et al., 2009; Jilcott Pitts et al., 2013; Jones, Devers, et al., 2010; Rivera-Ramos & Buki, 2011; Thompson et al., 2011; Wackerbarth et al., 2005; Winterich et al., 2009). For example, an African-American man reported "…probing around in my rectum . . . [is] treading on my masculinity" (Beeker et al., 2000, p. 268). Similarly, another African-American man stated "…biggest fear…someone placing something in my rectum, that's how most men are" (Winterich et al., 2009, p. 6). When describing a friend who had undergone CRC screening, a Hispanic man reported "[My friend] told me he had lost his manhood. So, we must be very careful with that because people think that they lose their manhood" (Jones, Devers, et al., 2010, p. 512). Yet another man asserted "I think it's problematic for men…especially homophobic men…they think you let someone do that to you, you ain't a real man" (Jones, Devers, et al., 2010, p. 512). Identifying colonoscopy specifically, one man noted "…you know, guys are usually reluctant to have colonoscopies because I guess it is a male ego thing you know, having something inserted into your rectum" (Bass et al., 2011, p. 124). These quotations highlight themes of masculinity that have been revealed by a number of men in qualitative studies on CRC screening.

A few quantitative studies of cancer screening and prevention have broached the topics of masculinity and/or concerns about screening involving the rectum (Jones, Devers, et al., 2010; Millar & Houska, 2007; Paiva, Motta, & Griep, 2011). In a study of intention to perform self-examination for skin cancer, men and women with low levels of masculinity were more likely to report intention to perform the behavior than those with high levels of masculinity (Millar & Houska, 2007). To this author's knowledge, only one quantitative study has evaluated the role of masculinity in cancer screening involving the rectum (Paiva et al., 2011). This study focused on prostate cancer screening and used a single item to assess perceptions of masculinity with respect to prostate cancer screening (Paiva et al., 2011). Researchers found that more than one-third of participants reported they agreed with the following statement: "the prostate examination can affect masculinity" (34.4%) (Paiva et al., 2011). In a study of CRC screening decision-making among both men and women, the statement "I do not want a tube inserted in my rectum" was ranked as one of the top five barriers to colonoscopy and sigmoidoscopy (Jones, Devers, et al., 2010). This statement was the top-ranked barrier for those who had never been screened and was ranked second by those overdue for screening (Jones, Devers, et al., 2010). However, it is unclear whether masculinity beliefs influenced men's decisions regarding CRC screening (Jones, Devers, et al., 2010).

Proposed Relationships between Aspects of Masculinity and Colorectal Cancer Screening

Given that some men have voiced concerns that cancer screening tests involving the rectum (i.e., endoscopy, DRE) are an affront to masculinity norms (Bass et al., 2011; Beeker et al., 2000; Getrich et al., 2012; Goldman et al., 2009; Harvey & Alston, 2011;

Holt et al., 2009; Jilcott Pitts et al., 2013; Jones, Devers, et al., 2010; Rivera-Ramos & Buki, 2011; Thompson et al., 2011; Wackerbarth et al., 2005; Winterich et al., 2009), it was proposed that three masculinity norms (i.e., heterosexual self-presentation, risk-taking, and self-reliance) would be inversely related to CRC screening adherence among men at average CRC risk. First, it was hypothesized that heterosexual self-presentation would be inversely related to CRC screening adherence. According to masculinity theory (Brannon, 1976; Courtenay, 2011), masculine, heterosexual men should disdain homosexuality, fear gay individuals (especially gay men), and preserve their own heterosexuality. Qualitative research supports this notion with men emphasizing their concern that cancer screening involving the rectum could affect their sexuality or be indicative of homosexuality (Getrich et al., 2012; Harvey & Alston, 2011; Holt et al., 2009; Jones, Devers, et al., 2010; Thompson et al., 2011; Winterich et al., 2011). If a man visits his provider and receives a CRC screening recommendation, colonoscopy is the most likely test to be recommended (Klabunde et al., 2009; McQueen et al., 2009). It is unlikely that a patient will be fully informed about all screening test options (Klabunde et al., 2009; McQueen et al., 2009), and those men who would be more comfortable with FOBT or FIT (i.e., men adhering to the heterosexual self-presentation masculinity norm) may go unscreened if only offered screening methods involving penetration of the rectum (McQueen et al., 2009).

Second, it was hypothesized that the masculinity norm of risk-taking would be inversely related to CRC screening adherence. Endorsement of the risk-taking masculinity norm has been associated with performance of risky health behaviors (e.g., smoking, drinking to intoxication) (Mahalik et al., 2003), but has not been examined with

regard to CRC screening adherence. According to masculinity theory (Courtenay, 2000a, 2000b, 2011; Nicholas, 2000), men who hold risk-taking beliefs may not feel that CRC or other diseases are a threat to their well-being. In addition, masculinity theory suggests that these individuals may not be concerned about their health, attend preventive health services, or undergo CRC screening (Courtenay, 2000a, 2000b, 2011; Nicholas, 2000). For example, a study of skin cancer reduction behaviors (i.e., sunscreen usage and skin self-examination) included a masculinity measure with an item addressing risk-taking beliefs (Bem, 1974; Millar & Houska, 2007). The results of this study indicated that individuals endorsing higher levels of masculinity were: 1) less likely to report distress about skin cancer risks and 2) more likely to report being in better health compared to individuals with lower levels of masculinity beliefs (Millar & Houska, 2007). Furthermore, individuals reporting higher levels of masculinity reported lower levels of intention to engage in skin cancer self-examination (Millar & Houska, 2007).

In the current study, it was hypothesized that the relationship between risk-taking and CRC screening adherence would be partially mediated by cancer fear. Specifically, based on masculinity theory (Courtenay, 2000a, 2000b, 2011), it was predicted that greater risk-taking would be associated with lower levels of cancer fear, which, in turn, would be associated with a lower likelihood of CRC screening adherence. According to masculinity theory (Courtenay, 2000a, 2000b, 2011; Nicholas, 2000), masculinity ideals such as risk-taking bolster the belief that men should deny vulnerability to diseases. Thus, the theory predicts an inverse association between risk-taking beliefs and cancer fear. Additionally, in a study of prostate cancer screening, trait fear was positively associated with screening behavior (Consedine, Morgenstern, Kudadjie-Gyamfi, Magai,

& Neugut, 2006). Prior research has demonstrated mixed results with regard to the relationship between cancer fear and cancer screening in primarily female samples (Consedine et al., 2004; Hay, Buckley, & Ostroff, 2005). However, in a review of the literature on breast cancer screening, Consedine and colleagues (2004) found that general cancer fear may be associated with increases in cancer screening, whereas fear of specific aspects of screening or the specific disease type (e.g., belief that screening is painful or embarrassing, fears of specific cancer treatments if diagnosed with cancer) are inversely associated with cancer screening. These researchers suggested that "acting to reduce generalized cancer worry may, in many cases, involve engaging in a screening behavior as the individual seeks to reduce their anxiety" (Consedine et al., 2004, p. 507). In the present study, general cancer fear was measured and, therefore, a positive association between cancer fear and CRC screening adherence was hypothesized.

It was also hypothesized that age would moderate the strength of the relationship between cancer fear and CRC screening adherence such that the relationship between cancer fear and CRC screening would be weaker with increasing age. In studies of cancer survivors, age has been inversely related to fear of cancer recurrence (Crist & Grunfeld, 2013; Lebel, Beattie, Arès, & Bielajew, 2013; Ziner et al., 2012). Additionally, increasing age has been found to be inversely related to fear of death (Cicirelli, 2006). Furthermore, in a study of adult women aged 30 to 74, older women reported less breast cancer worry than younger women (Harris et al., 1991). Thus, although the current study was focused upon men, increasing age was predicted to be inversely related to fear of cancer, rendering it a weak predictor of CRC screening in older age groups.

Third, it was hypothesized that self-reliance would be inversely related to CRC screening adherence. Masculinity theory suggests that men who endorse self-reliance ideals may not have a consistent health care provider and, therefore, may not have an opportunity to receive a recommendation for CRC screening (Boman & Walker, 2010; Courtenay, 2000a, 2000b, 2011; Hammond, Matthews, & Corbie-Smith, 2010; Iwamoto et al., 2011; Locke & Mahalik, 2005; Mahalik et al., 2006; Mahalik et al., 2003; Nicholas, 2000; Pachankis et al., 2011; Pleck et al., 1993; Wade, 2009). These individuals may not believe that "real men" see primary care providers (PCPs) for preventive care or undergo cancer screening. Indeed, individuals who endorse self-reliance ideals may not trust physicians due to the belief that one should not ask for help and their infrequent interactions with health care providers. Lack of trust in one's physician and the medical system has been indicated as a barrier to CRC screening and other preventive health services, especially among individuals from ethnic minority groups (Fyffe, Hudson, Fagan, & Brown, 2008; Greiner, Born, Nollen, & Ahluwalia, 2005; Hammond, Matthews, Mohottige, Agyemang, & Corbie-Smith, 2010; Jones, Devers, et al., 2010). Thus, it was hypothesized that the relationship between self-reliance and CRC screening adherence would be partially mediated by trust in PCP. Specifically, it was expected that greater self-reliance would be associated with lower levels of trust in PCP, which, in turn, would be associated with a lower likelihood of CRC screening adherence.

Length of patient-provider relationship and race were hypothesized to influence the relationship between trust in one's physician and CRC screening adherence. From a theoretical standpoint, trust in PCP has been conceptualized as stemming from both

interpersonal trust through multiple interactions with a PCP as well as social trust which includes trust of healthcare institutions (Pearson & Raeke, 2000). Described as "patient trust theory," patients' trust in their PCP is "built through repeated interactions through which expectations about a person's trustworthy behavior can be tested over time" (Pearson & Raeke, 2000, p. 510). Length of the patient-provider relationship has been positively correlated with trust in PCP (r = 0.27) (Kao, Green, Davis, Koplan, & Cleary, 1998; Mainous, Baker, Love, Gray, & Gill, 2001). In addition, trust in PCP has been predictive of the receipt of preventive health services (i.e., mammography, flu vaccine, eye examination) (Parchman & Burge, 2004). Furthermore, ethnic minority patients have been found to report lower levels of trust in PCPs relative to White patients (Boulware, Cooper, Ratner, LaVeist, & Powe, 2003; Doescher, Saver, Franks, & Fiscella, 2000; Halbert, Armstrong, Gandy, & Shaker, 2006; Musa, Schulz, Harris, Silverman, & Thomas, 2009). In one study, race (African American vs. White) and trust in PCP did not interact to predict receipt of prostate-specific antigen tests (Musa et al., 2009). However, as indicated by ethnic minority men in numerous qualitative studies of cancer screenings involving the rectum, endoscopic CRC screening was considered to be invasive and an affront to masculinity norms (Bass et al., 2011; Beeker et al., 2000; Getrich et al., 2012; Harvey & Alston, 2011; Holt et al., 2009; Rivera-Ramos & Buki, 2011; Winterich et al., 2011; Winterich et al., 2009). Therefore, trust in PCP may be especially important in overcoming these barriers to CRC screening among ethnic minority men. Thus, it was hypothesized that race and length of patient-provider relationship would moderate the strength of the relationship between trust in PCP and CRC screening adherence. Specifically, it was expected that the relationship between trust in PCP and CRC

screening would be stronger among African Americans compared to Whites and with increasing length of patient-provider relationship.

As previously noted, endoscopic screening (i.e., colonoscopy, sigmoidoscopy) may be difficult for some men due to the perceived breach of masculinity norms (Bass et al., 2011; Beeker et al., 2000; Getrich et al., 2012; Goldman et al., 2009; Harvey & Alston, 2011; Holt et al., 2009; Jilcott Pitts et al., 2013; Jones, Devers, et al., 2010; Rivera-Ramos & Buki, 2011; Thompson et al., 2011; Wackerbarth et al., 2005; Winterich et al., 2009). Due to the invasive nature of endoscopic procedures, masculinity variables may be differentially associated with stool blood test (e.g., FOBT or FIT) versus endoscopic screening modalities (i.e., sigmoidoscopy or colonoscopy). Men perceive colonoscopy to be more invasive than sigmoidoscopy (Friedemann-Sanchez et al., 2007). Although colonoscopy is a commonly-used method of CRC screening at the proposed setting of this study (Roudebush Veterans Affairs Medical Center [VAMC] in Indianapolis, Indiana), few patients at Roudebush VAMC currently receive sigmoidoscopy (Rao, personal communication, January 18, 2013). Due to the invasive nature of sigmoidoscopy and colonoscopy, these two screening modalities were combined into a single outcome of "endoscopy." Due to the non-invasive nature and identical testing schedules of FOBT and FIT, these two stool blood tests were combined into a single outcome of "stool blood test." In the present study, CRC screening adherence was considered as both a combined and separate outcome (i.e., adherence to stool blood test [FOBT or FIT] or endoscopy [sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]).

PRESENT STUDY

The current study aims to understand associations between aspects of masculinity, health beliefs, and CRC screening adherence in 350 male Veterans Affairs (VA) primary care patients aged 51-75 years with average CRC risk. This study targeted adult males who were age-appropriate and at average risk for CRC, including stool blood test (FOBT or FIT) or endoscopy (sigmoidoscopy or colonoscopy) procedures (Levin et al., 2008). The setting of the Roudebush VAMC in Indianapolis, Indiana was selected, as there are a large number of men utilizing primary care at this setting who have access to stool blood test (FOBT or FIT) and endoscopy (sigmoidoscopy or colonoscopy) services regardless of health insurance status. Colonoscopy, FOBT, and sigmoidoscopy are the most commonly utilized screening modalities in the national VA Health Administration (Long et al., 2012). In addition, since 2005, VA hospitals across the country have attempted to increase CRC screening among veterans as part of a CRC diagnosis and care quality improvement strategy (Jackson et al., 2010).

In a recent study considering data from more than 36,000 veterans nationwide, more than 80% of eligible veterans were adherent to CRC screening recommendations (Long et al., 2012). Of those veterans adherent to current CRC screening recommendations, nearly 72% received colonoscopy in the past 10 years, 24% completed FOBT in the past year, and nearly 4% received sigmoidoscopy in the past 5 years (Long

et al., 2012). The Roudebush VAMC has CRC screening rates slightly lower than national VA Health Administration rates; however, these screening rates are still higher than the CRC screening adherence rates found in the general United States population (Haggstrom, personal communication, November 1, 2012). Given that unscreened VA patients have access to CRC screening services and are likely to have received a recommendation for CRC screening from their PCP, they are an especially unique population to study.

Primary Objectives. The aims and hypotheses of the present study are as follows: Aim 1: Examine the extent to which three aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) are associated with CRC screening adherence (i.e., stool blood test [FOBT or FIT] in the past year or endoscopy [i.e., sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) in male VA primary care patients aged 51-75 while controlling for age, race, and education level.

> *Hypothesis 1.1: Controlling for age, race, and education level, three aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) will be inversely associated with CRC screening adherence (i.e., stool blood test [FOBT or FIT] in the past year or endoscopy [sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]).*

Aim 2: Examine potential mediators of the relationship between aspects of masculinity (i.e., risk-taking and self-reliance) and CRC screening adherence (i.e., stool blood test [FOBT or FIT] in the past year or endoscopy [sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) in male VA primary care patients aged 51-75 while controlling for age, race, and education level.

> *Hypothesis 2.1: Controlling for age, race, and education level, cancer fear will partially mediate the relationship between risk-taking and CRC screening adherence (i.e., stool blood test [FOBT or FIT] in the past year or endoscopy*

[sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) in male VA primary care patients aged 51-75.

Hypothesis 2.2: Controlling for age, race, and education level, trust in PCP will partially mediate the relationship between self-reliance and CRC screening adherence (i.e., stool blood test [FOBT or FIT] in the past year or endoscopy [sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) in male VA primary care patients aged 51-75.

Aim 3: Examine potential moderators of relationships specified in the models proposed in Aim #2 while controlling for demographic covariates.

Hypothesis 3.1: Controlling for race and education level, age will moderate the strength of the relationship between cancer fear and CRC screening adherence such that the relationship between cancer fear and CRC screening will be weaker with increasing age.

Hypothesis 3.2: Controlling for age and education level, race will moderate the strength of the relationship between trust in PCP and CRC screening adherence such that the relationship between trust in PCP and CRC screening will be stronger among African Americans compared to Whites.

Hypothesis 3.3: Controlling for age, race, and education level, length of patient-provider relationship will moderate the strength of the relationship between trust in PCP and CRC screening adherence such that the relationship between trust in PCP and CRC screening will be stronger with increasing length of patient-provider relationship.

Aim 4: Examine the extent to which three aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) are associated with CRC screening behavior, controlling for the effects of variables recognized as significant predictors of CRC screening in prior research (i.e., White race, older age, higher education level, physician recommending CRC screening, family and friends recommending CRC screening).

Hypothesis 4.1: Aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) will predict CRC screening adherence above and beyond the predictive value of race, age, education, physician recommending CRC screening, and family/friend recommending CRC screening.

Aim 5: Examine associations between three aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) and CRC screening status (i.e., non-adherence, adherence with stool blood test [FOBT or FIT in the past year], or adherence with endoscopy [sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) in male VA primary care patients aged 51-75 while controlling for age, race, and education level.

METHODS

Participant Selection

A sample of 350 male veterans who were at average CRC risk and receiving care at the Roudebush VAMC in primary care clinics were enrolled in the study. Eligibility criteria included male gender, age 51-75, average CRC risk (i.e., no prior colon or rectal cancer diagnoses or diagnoses of a medical condition which would place the individual at increased risk for CRC such as Crohn's disease, ulcerative colitis, familial adenomatous polyposis, or Lynch syndrome based upon self-report and medical record review, and no prior CRC diagnoses in two or more first-degree relatives or in a first-degree relative prior to age 60 based upon self-report and medical record review), able to read and write in English, no serious cognitive impairment, and scheduled for an upcoming appointment in the primary care clinic with either a PCP (e.g., physician or nurse practitioner) or a registered nurse (RN).

Two hundred and thirty-three of the study participants (67%) were adherent to CRC screening recommendations (i.e., had a stool blood test [FOBT or FIT] in the past year, a sigmoidoscopy in the past 5 years, or a colonoscopy in the past 10 years), and 117 were non-adherent to these recommendations. Originally, the dissertation proposal had specified that 150 individuals would be adherent to CRC screening recommendations and 150 individuals would be non-adherent for a total sample size of 300 participants.

However, the total sample size was increased to 350 participants in order to increase statistical power for the proposed analyses. In addition, the proposal specified that after reaching the target sample of participants adherent to CRC screening (n = 150), individuals would be ineligible for this study if they were currently adherent to CRC screening recommendations. However, given the high rates of CRC screening among veterans accessing primary care services as well as lower rates of consent among those who were non-adherent, the sample of 150 adherent veterans was achieved more rapidly than the recruitment of those non-adherent to CRC screening guidelines. Due to methodological concerns (i.e., confounding time of recruitment with adherence status), it was decided that individuals from both groups (i.e., adherent and non-adherent) would continue to be consented until the total sample size of 350 was reached.

Recruitment Procedures

The electronic medical records of male veterans aged 51-75 who were scheduled for an upcoming primary care appointment to see their PCP or an RN at Roudebush VAMC were reviewed for CRC screening adherence and history of a CRC diagnosis. First, patient gender, age, and absence of a personal history of CRC were confirmed via medical record in order to identify male veterans between the ages of 51 and 75 who may be eligible for the study. Adherence to endoscopy [colonoscopy or sigmoidoscopy] or stool blood test [FOBT or FIT] recommendations (e.g., stool blood test [FOBT or FIT] in the past year or endoscopy [sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) was noted based upon the date of the participant's last FOBT, FIT, sigmoidoscopy, or colonoscopy (if applicable) in the medical records. Individuals were

considered CRC screening adherent if they had completed an FOBT or FIT in the past year, a sigmoidoscopy in the past 5 years, or a colonoscopy in the past 10 years; CRC screening adherence was coded as "yes" or "no." While recognizing that there are multiple screening modalities for those at average risk for the disease (Levin et al., 2008), almost all U.S. veterans adherent to CRC screening recommendations receive FOBT, colonoscopy, or sigmoidoscopy (Long et al., 2012). In addition, providers at Roudebush VAMC have recently begun using FIT (Rao, personal communication, January 18, 2013). Thus, only the performance of these screening behaviors (i.e., stool blood test [FOBT or FIT] or endoscopy [sigmoidoscopy or colonoscopy]) were considered to be indicative of CRC screening adherence during the review of patients' medical records.

Individuals were consecutively approached in the primary care clinic waiting room at the Roudebush VAMC before or after their PCP visit. The informed consent process occurred in either a private area of the primary care clinic, away from other patients in the primary care clinic waiting room, or in a clinic examination room. A trained project coordinator or research assistant (RA) described the study, reviewed the consent and authorization forms, answered questions, and invited veterans to participate. During the informed consent process, the project coordinator or RA asked the participant to verbalize his understanding of the study. If the veteran was unable to clearly describe the study, he was considered ineligible due to likely cognitive impairment or language difficulties. In addition, via a paper questionnaire, the veteran was asked if he: 1) had been diagnosed with either colon or rectal cancer, Crohn's disease, ulcerative colitis, familial adenomatous polyposis, Lynch syndrome, or colon polyps in the past, and 2) had a first-degree relative who had been diagnosed with CRC. Those with a familial history

of CRC indicated whether a first-degree relative had been diagnosed with CRC prior to the age of 60 and the number of first-degree relatives who had been diagnosed with CRC. Veterans providing affirmative responses to any of the personal health questions and those having two or more first-degree relatives with a history of CRC or a first-degree relative with a diagnosis of CRC prior to age 60 were considered to be at high risk for CRC and, thus, were ineligible for the study. This medical history information was obtained via paper questionnaire so that the confidentiality of the patient's medical history was retained in the primary care clinic waiting room. The screening questionnaire required approximately 3 minutes to complete. Interested, eligible veterans signed the informed consent and HIPAA authorization form prior to study participation.

Data Collection Procedures

In order to minimize the impact of the study on the primary care clinic flow, following informed consent and HIPAA authorization, the paper survey could be completed before, during, and/or immediately after a clinic visit. The survey required approximately 14 minutes to complete. The project coordinator or RA was available to answer participants' questions in the primary care clinic waiting room. After completing the survey, the patient returned the survey to the project coordinator or RA. At that time, the RA or project coordinator checked the questionnaire for omitted item responses. If there were omissions, the research team member asked the participant whether he intended to skip the item.

If the participant was unable to complete the survey while in clinic due to time constraints, he was given an addressed, stamped envelope to complete the survey at home

and return the survey to the project coordinator. If the survey was not returned within 14 days, the project coordinator or RA called the participant to remind him to complete and return the survey. If the survey was not returned within 14 days of the reminder phone call, the project coordinator or RA once again called the participant to remind him to complete and return the survey to the research team. Upon completion, the participant either hand-delivered (in the case of in-clinic completion) or mailed (in the case of at-home completion) the survey to the project coordinator or RA, and the participant was given a $10 Walmart gift card. In the case of individuals who completed their survey at home, their gift card was sent via US mail after the survey had been returned to the research team. The project coordinator collected the following information from the medical records after completion of informed consent and HIPAA authorization forms: 1) the date of first visit to the PCP, 2) the date of last colonoscopy, sigmoidoscopy, FOBT, and/or FIT (if applicable), 3) medical diagnoses indicative of increased CRC risk (i.e., personal history of colon or rectal cancer, Crohn's disease, ulcerative colitis, familial adenomatous polyposis, Lynch syndrome, or colon polyps in the past, or two or more first-degree relatives who have been diagnosed with CRC or a first-degree relative who has been diagnosed with CRC prior to age 60), 4) zip code, and 5) PCP name.

Measures

Eligibility was assessed via medical record review and self-report. The self-report screening survey included an assessment of personal health and family health diagnoses which place one at higher risk for CRC to assess for eligibility (see Appendix A) (Centers for Disease Control and Prevention, 2006; Rawl et al., under revision; Rawl et al., 2000;

Rawl et al., 2005). Individuals identified as being at high risk of CRC were ineligible for the study. Once enrolled, participants were asked to complete a paper survey (see Appendix B). The survey included an assessment of demographic characteristics, personal health characteristics, health experiences, trust in PCP, adherence to masculinity norms, and cancer-related fear. The personal health characteristics and health experience measures have been utilized in a large randomized controlled trial which investigated CRC screening adherence following receipt of two CRC screening interventions delivered in primary care (Christy et al., 2013; Rawl et al., under revision; Rawl et al., 2012) as well as studies examining CRC screening adherence in those at increased risk for the disease (Rawl et al., under review; Rawl et al., 2000; Rawl et al., 2005). Measures of trust in PCP, adherence to masculinity norms, and cancer-related fear have been well-validated (Champion et al., 2004; Dugan, Trachtenberg, & Hall, 2005; Parent & Moradi, 2009; Parent & Moradi, 2011; Parent, Moradi, Rummell, & Tokar, 2011).

Demographic Characteristics. Seven items were used to assess demographic information, including age, race, marital status, employment status, income, health insurance status, and education (Centers for Disease Control and Prevention, 2011; Mosher et al., 2012). With the individual's permission, the following information was collected from his medical record: length of patient-provider relationship (first visit with current PCP subtracted from date of consent), CRC screening adherence, CRC screening test modality completed (if applicable), and CRC risk factors (personal history of colon or rectal cancer, Crohn's disease, ulcerative colitis, familial adenomatous polyposis, Lynch syndrome, or colon polyps in the past or having a close family relative who had been diagnosed with CRC prior to age 60 or two or more close family relatives who had

been diagnosed with CRC). Although the participant may have been seen by an RN during the current visit, the length of his relationship with his PCP was obtained rather than the length of his relationship with the RN because the PCP was likely to be the provider referring the participant for CRC screening. Adherence to colonoscopy, sigmoidoscopy, or FOBT/FIT recommendations (i.e., colonoscopy in the past 10 years, sigmoidoscopy in the past 5 years, or FOBT or FIT in the past year) was also collected based upon the date of the participant's last colonoscopy, sigmoidoscopy and/or stool blood test [FOBT or FIT] (if applicable).

Health Information and Behaviors. Sixteen items assessed patients' personal cancer history, whether they had a distant relative, friend, or co-worker who had been diagnosed with CRC, CRC screening behaviors, and prior recommendations for CRC screening from a physician, family member, or friend. The majority of these questions were used in an NCI-funded randomized controlled trial examining CRC screening adherence among primary care patients (Christy et al., 2013; Rawl et al., under revision; Rawl et al., 2012) and utilize "yes" or "no" responses. The CRC screening behavior items were modified from measures developed by Rawl and colleagues (2000, 2005, 2012, under revision, under review). In the original studies, these items were delivered via telephone; in the current study, the items regarding the time of the veteran's last CRC screening test were modified so that participants could respond to these open-ended questions via paper survey. Although CRC screening adherence was gathered from the participants' medical record, some participants received CRC screening outside of the VAMC system and medical record data confirming that procedure were not always available. Thus, participants were asked whether they underwent FOBT or FIT in the

past year, flexible sigmoidoscopy in the past 5 years, or colonoscopy in the past 10 years and the location of these tests, if applicable. In the case of discrepancy between the medical record and self-report, the medical record data were used to determine screening status. Often, the medical record clearly identified CRC screening adherence as evidenced by either receipt of the screening test at the VAMC or by scanned medical records from an outside facility. However, if patients had reported adherence to CRC screening at an outside facility to their PCP (i.e., noted by the PCP in the medical record), but this was not supported by outside records which had been entered into the medical record and they reported non-adherence to CRC screening on the study survey, patients were coded as non-adherent. Given the research questions posed, individuals who were adherent to both stool blood test and endoscopy at the time of consent were coded as adherent to endoscopy.

Trust in PCP. Five items assessed the patient's trust in his PCP (Dugan et al., 2005). In the original measure development study, participants responded to items over the phone such as "sometimes Dr._ [INSERT NAME OF DR.]__ cares more about what is convenient for (him/her) than about your medical needs," which were individualized with the participants' doctor's name (Dugan et al., 2005). Test-retest reliability of the measure over two months was 0.71 and Cronbach's alpha was 0.87 (Dugan et al., 2005). In the current study, participants were asked to think about their PCP while responding to items such as "sometimes your doctor cares more about what is convenient for him or her than about your medical needs." Responses were measured on a 5-point, Likert-type scale with responses ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) (Dugan et al., 2005). In the current study, the internal consistency reliability of this scale was .870.

Conformity to Masculine Norms Inventory-46. The Conformity to Masculine Norms Inventory-46 (CMNI-46) (Parent & Moradi, 2009) is a 46-item, shortened version of the original 94-item Conformity to Masculine Norms Inventory (Mahalik et al., 2003). Forty-six items assessed the following masculinity norms: Risk-taking, Winning, Violence, Emotional Control, Self-reliance, Power Over Women, Playboy, Primacy of Work, and Heterosexual Self-Presentation (Parent & Moradi, 2009). Internal consistency reliability of the 46-item measure was adequate in the original measure development study ($\alpha = 0.82$) (Parent & Moradi, 2011). In addition, correlations between the subscales of the original Conformity to Masculine Norms Inventory and those of the 46-item version ranged from 0.89 to 0.98 (Mahalik et al., 2003; Parent & Moradi, 2009). Responses were measured using a four-point Likert-type scale ranging from 0 (*strongly disagree*) to 3 (*strongly agree*).

Three subscales of the measure (i.e., heterosexual self-presentation, risk-taking, and self-reliance) were examined in this study. The following items were reverse-scored: 5, 6, 10, 17, and 38 (Parent & Moradi, 2009; Parent & Moradi, 2011). Items 5, 14, 17, 24, 37, and 46 were summed and the average was taken to determine the heterosexual self-presentation subscale score (Parent & Moradi, 2009; Parent & Moradi, 2011). In the current study, internal consistency reliability of this subscale was .852. For the risk-taking subscale score, items 6, 8, 16, 28, and 35 were summed and the average was determined (Parent & Moradi, 2009; Parent & Moradi, 2011). Internal consistency reliability of this subscale was .698 in the present study. Finally, items 3, 10, 26, 38, and

43 were summed and averaged to calculate the self-reliance subscale score (Parent & Moradi, 2009; Parent & Moradi, 2011). In the current study, internal consistency reliability of this subscale was .746.

Cancer-related Fear. Cancer-related fear was measured using eight items modified from the Breast Cancer Fear Scale developed by Champion and colleagues (2004). In the original study, eight items were retained (e.g., "when I think about breast cancer, I feel anxious"); in the current study, the specifier of "breast" cancer was deleted so that the eight items would reflect general cancer fear (e.g., "when I think about cancer, I feel anxious") (Champion et al., 2004). Reliability of the Breast Cancer Fear Scale has been established; Cronbach's alpha was shown to be $\alpha = 0.91$ and two to three month test-retest reliability was demonstrated to be 0.70 (Champion et al., 2004). Responses were measured using a five-point, Likert-type scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) (Champion et al., 2004). The mean of the summed score was used in analyses. Internal consistency reliability of this scale was .922 in the present study.

Statistical Analyses

Data Cleaning and Reduction. All data were analyzed using SPSS (Version 22, Copyright © 2013 IBM SPSS Statistics, Chicago, IL, USA). First, the amount of missing data was determined (Schafer & Graham, 2002). Next, it was determined whether data were missing at random or if there was a pattern in nonresponse (Schafer & Graham, 2002). Using Little's MCAR test, it was determined that data were not missing completely at random. A variety of methods for handling missing data were considered including casewise deletion, listwise deletion, maximum likelihood (ML), and single and

multiple imputation (MI). Ultimately, series mean imputation was chosen because in the case of all but the income variable, less than 5% of any data were missing. The dissertation proposal stated that single imputation would be used in the case of variables missing less than 5%, multiple imputation would be used in the case of variables missing more than 5%, and NORM software would be utilized to impute five data sets. However, it was found that only one variable, income, had missing data greater than this amount (6.7% missingness) and that the NORM software was out-of-date. Given the low amount of missing data, series mean imputation was instead utilized, and values were randomly assigned (Rand, personal communication, September 22, 2014). All study scale scores and the length of the patient-provider relationship were calculated prior to conducting the primary analyses. The length of the patient-provider relationship was calculated by subtracting the date of the participant's first visit to his PCP (as reported in the electronic medical record) from the date of consent. In addition, physician recommendation for CRC screening was calculated such that individuals responding "yes" to any of the three questionnaire items assessing whether they had received a recommendation for stool blood test, sigmoidoscopy, or colonoscopy from their doctor were coded as having received a physician recommendation. Individuals at increased risk for CRC and those who consented, but failed to complete more than 60% of the study questionnaire, were excluded from analyses.

Preliminary analyses (i.e., descriptive statistics, scatterplots, histographs, residual score analysis) were conducted to examine the data for normality, linearity, kurtosis, homoscedasticity, and outliers. Outliers were examined as potential data entry errors. Descriptive statistics were computed to characterize the participants' demographic

characteristics, health experiences, trust in PCP, cancer fear, masculinity subscale scores, and CRC screening adherence. Correlations between study variables were also computed. Ultimately, data from 327 individuals were analyzed.

Analyses for Aim #1. Analyses for Aim #1 examined the extent to which three aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) were associated with CRC screening adherence (i.e., stool blood test [FOBT or FIT] in the past year or endoscopy [sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) while controlling for age, race, and education level. It was hypothesized that three aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) would be inversely associated with CRC screening adherence (i.e., stool blood test [FOBT or FIT] in the past year or endoscopy [sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) (see Aim #1, Hypothesis #1.1). To test this hypothesis, three separate logistic regression analyses were conducted to examine the relationship between the masculinity variables (i.e., heterosexual self-presentation, risk-taking, and self-reliance) and CRC screening adherence (coded "yes" or "no") while controlling for age, race, and education level.

Analyses for Aims #2 and #3. Using the Hayes (2012, 2013) PROCESS macro, analyses were conducted to examine whether: 1) the relationship between risk-taking and CRC screening adherence was partially mediated by cancer fear (Aim #2, Hypothesis #2.1) while controlling for age, race, and education level; 2) the relationship between self-reliance and CRC screening adherence was partially mediated by trust in PCP (Aim #2, Hypothesis #2.2) while controlling for age, race, and education level; 3) age moderated the strength of the relationship between cancer fear and CRC screening

adherence such that the relationship between cancer fear and CRC screening was weaker with increasing age (Aim #3, Hypothesis #3.1) while controlling for race and education level; 4) race moderated the strength of the relationship between trust in PCP and CRC screening adherence such that the relationship between trust in PCP and CRC screening was stronger among African-Americans compared to Whites (Aim #3, Hypothesis #3.2) while controlling for age and education level; and 5) length of patient-provider relationship moderated the strength of the relationship between trust in PCP and CRC screening adherence such that the relationship between trust in PCP and CRC screening was stronger with increasing length of patient-provider relationship (Aim #3, Hypothesis #3.3) while controlling for age, race, and education level.

Both Preacher and Hayes's method of moderated mediation and structural equation modeling were considered for analyses (Hayes, 2009). After careful consideration, it was decided that Preacher and Hayes's method of moderated mediation would be used in this study (Hayes, 2009). With moderated mediation, a researcher is able to examine whether a variable (X) affects an outcome (Y) indirectly through a mediator, and if that indirect effect is stronger among certain groups of participants (a moderator) (Hayes, 2009, 2013). Use of the Hayes (2012, 2013) PROCESS macro allowed for a direct test of the proposed pathways and relationships among variables. If structural equation modeling analyses had been used, it would have required a multiple group comparison of models without allowing for a direct test of the proposed pathways and relationships (Hayes, 2009, 2013).

The PROCESS macro combines Hayes's prior macros (i.e., MODMED, MODPROBE, SOBEL, INDIRECT, and MEDTHREE/MED3C) and allows for more

complex analyses than did previously available macros (Hayes, 2012, 2013). Using bootstrapping, the PROCESS macro examines indirect effects of moderated mediation through logistic regression or ordinary least squares regression analyses (Hayes, 2012, 2013). Bootstrapping allowed for the examination of the indirect effects of masculinity beliefs on CRC screening adherence through health beliefs such as cancer fear and trust in PCP through resampling from the data set five thousand times (Preacher & Hayes, 2004; Preacher & Hayes, 2008; Shrout & Bolger, 2002). Advantages of the bootstrapping method include the lack of assumption of normality and enhanced power to detect indirect effects relative to older statistical methods (Preacher & Hayes, 2004; Preacher & Hayes, 2008; Shrout & Bolger, 2002). The bootstrapping method was used to estimate a 95% confidence interval; if the confidence interval did not include zero, the indirect effect was considered statistically significant (Preacher & Hayes, 2004; Preacher & Hayes, 2008; Shrout & Bolger, 2002).

Demographic covariates were included in all models. Specifically, because higher education has been associated with performance of CRC screening in prior research (Beydoun & Beydoun, 2008; Cokkinides, Chao, Smith, Vernon, & Thun, 2003; Halbert et al., 2011), education (i.e., HS diploma, GED, or less education vs. some college or more education) was included as a covariate in all models. In addition, older age has been associated with receipt of CRC screening (Beydoun & Beydoun, 2008; Cokkinides et al., 2003; Tessaro et al., 2006). Thus, age was a covariate in all models, with the exception of Aim #3, Hypothesis #3.1, which included age as a moderator. Furthermore, because White race has been associated with a higher likelihood of CRC screening in prior research (Beydoun & Beydoun, 2008), race (i.e., White vs. minority

race) was a covariate in all models with the exception of Aim #3, Hypothesis #3.2, which included race (i.e., White vs. Black or African-American race) as a moderator.

Because the PROCESS macro uses bias-corrected bootstrapping to correct for data with a non-normal distribution (Hayes, 2012, 2013), the work of Fritz and MacKinnon (2009) was consulted in order to determine the appropriate sample size to obtain 80% power. It would have been ideal to have an estimate of effect size in order to determine the necessary sample size for this study (Fritz & MacKinnon, 2007); however, because no prior study has examined the relationship between masculinity and CRC screening adherence, the effect size for the study was unknown. According to Fritz and MacKinnon (2009), for a study involving bias-corrected bootstrapping, a sample size between 34 (for large α and β effect sizes) and 462 (for small α and β effect sizes) is required. It was hypothesized that the effect sizes for α and β in the proposed study would likely be small or medium. Thus, with 350 participants, a moderate effect size (Cohen's $d = 0.39$) or 13% of the variance in the model may have been able to be detected with 80% power depending upon the effect sizes of the α and β paths (Fritz & MacKinnon, 2007).

Analyses for Aim #4. Aim #4, Hypothesis #4.1 stated that aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) would predict CRC screening adherence above and beyond the predictive value of race, age, education, physician recommending CRC screening, and family/friend recommending CRC screening. To test this hypothesis, logistic regression analyses were conducted with race, education, age, physician recommendation for CRC screening, and family or friend

recommendation for CRC screening entered on the first step of the equation and the three masculinity variables entered on the second step.

Analyses for Aim #5. The fifth aim was to examine associations between three aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) and CRC screening status (i.e., non-adherence, adherence with stool blood test [FOBT or FIT in the past year], or adherence with endoscopy [sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) in male VA primary care patients aged 51-75 while controlling for age, race, and education level. To address this aim, a multinomial logistic regression analysis was used to examine the extent to which three aspects of masculinity predicted stool blood test screening (relative to non-adherence) and endoscopic screening (relative to non-adherence) while controlling for age, race, and education level.

RESULTS

Study Flow

A total of 561 male veterans with a scheduled PCP visit were approached regarding the study. One hundred and fifty-six veterans declined to participate either prior to (n = 151) or following eligibility screening (n = 5). Reasons for refusal include lack of interest, concern that participation would be too much work, health reasons, prior negative experiences with CRC screening, privacy concerns, enrollment or considering enrollment in another CRC study, and lack of time, among others (see Figure 1). Of note, five of the individuals who declined participation also mentioned being unable to complete paperwork or read. However, these 5 responses were considered refusals because the veterans were not adequately screened for eligibility (i.e., the ability to read and write). An additional 55 individuals were found to be ineligible during the screening or consent process. Reasons for ineligibility were based upon responses to the screening questionnaire (n = 24) and information gathered during the consent process (n = 31; e.g., demonstration of cognitive impairment, verbal report of ineligibility criteria). Interested and eligible veterans (N = 350) consented to participate in the study. Study flow and reasons for refusal and ineligibility are found in Figure 1.

Participant Characteristics

Of the 350 consenting individuals, 233 (67%) were adherent to current CRC screening guidelines and 117 were non-adherent. Twenty-three individuals either did not return their study questionnaires or returned questionnaires which had extensive missing data; thus, data from 327 participants were included in the current analyses. Of these, 213 individuals (65%) were adherent to CRC screening guidelines at the time of consent. Of the adherent participants, 196 individuals were adherent through the following tests: 1) colonoscopy alone, 2) both colonoscopy and sigmoidoscopy, or 3) both colonoscopy and stool blood testing. The other 17 adherent participants were adherent to stool blood testing alone. The remaining 114 individuals were non-adherent to CRC screening guidelines at the time of consent.

Sample characteristics are displayed in Table 2. The average age of study participants was 62 years (SD = 5.8). The majority of participants self-identified as White or Caucasian (73%), and 21% identified as Black or African American. Fifty-five percent were married and 64% had completed at least one semester of college. Most participants were unemployed or retired (69%), and more than half lacked health insurance other than VA benefits (59%) and reported a household income of less than $31,000 (59%). According to medical records, about half of participants had a female PCP (50.2%), and the average length of time that participants had seen their PCP was 48 months (SD = 46.57). Of note, 8.6% of participants did not have an identified PCP recorded in the medical record. The majority of participants (91%) reported that they had

received a recommendation from their physician to receive CRC screening, and 55% of participants reported that their family members or friends had recommended that they complete CRC screening.

Correlations Between Study Variables

Intercorrelations between study variables are displayed in Table 3. Briefly, correlational analyses showed that older age was associated with increased likelihood of CRC screening adherence ($p < 0.001$). Furthermore, White race was correlated with older age ($p = 0.023$), increased risk-taking ($p = 0.008$), and lower levels of heterosexual self-presentation ($p = 0.020$). Greater education was correlated with lower levels of heterosexual self-presentation and cancer fear ($p = 0.002$ and $p = 0.044$, respectively) as well as increased risk-taking and CRC screening adherence ($p = 0.014$ and $p = 0.022$, respectively). In addition, risk-taking was negatively correlated with heterosexual self-presentation ($p = 0.015$) and positively correlated with self-reliance ($p = 0.019$). Self-reliance also was positively associated with cancer fear ($p = 0.015$) and negatively associated with trust in one's PCP ($p = 0.004$). Having received a family member or friend recommendation for CRC screening was correlated with reduced trust in PCP ($p = 0.005$, greater cancer fear ($p = 0.019$), and receipt of a PCP recommendation for CRC screening ($p = 0.031$). Receiving a recommendation for CRC screening from a PCP or family member or friend was associated with increased likelihood of CRC screening adherence ($p < .001$ and $p = 0.034$, respectively). No additional significant relationships were found between study variables.

Aim 1 Results

Examine the extent to which three aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) are associated with CRC screening adherence (i.e., stool blood test [FOBT or FIT] in the past year or endoscopy [i.e., sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) in male VA primary care patients aged 51-75 while controlling for age, race, and education level..

Hypothesis 1.1 posited that three aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) would be inversely associated with CRC screening adherence (i.e., stool blood test [FOBT or FIT] in the past year or endoscopy [sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) while controlling for age, race, and education level. To test this hypothesis, each of the masculinity variables was examined as a predictor of CRC screening adherence in separate logistic regression analyses. As shown in Figures 2-4, none of the masculinity variables were significant predictors of screening status while controlling for age, education level, and race. In each of the three models, increasing age and lower levels of education were predictive of receiving CRC screening according to guidelines, whereas race did not predict this outcome (see Table 4).

Aim 2 Results

Examine potential mediators of the relationship between aspects of masculinity (i.e., risk-taking and self-reliance) and CRC screening adherence (i.e., stool blood test [FOBT or

FIT] in the past year or endoscopy [sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) in male VA primary care patients aged 51-75 while controlling for age, race, and education level.

Hypothesis 2.1 postulated that cancer fear would partially mediate the relationship between risk-taking and CRC screening adherence (i.e., stool blood test [FOBT or FIT] in the past year or endoscopy [sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) while controlling for age, race, and education level. To test this hypothesis, the indirect effect of risk-taking on CRC screening adherence through cancer fear was calculated using the bootstrapping method in the PROCESS macro (indirect effect = 0.0053, SE = 0.0238, p = 0.7892, 95% CI = -0.0202 to 0.0904; see Tables 5 and 6). As shown in Figure 5, cancer fear did not mediate the relationship between risk-taking and CRC screening adherence. There were no significant paths in the model.

Regarding Hypothesis 2.2, it was expected that trust in PCP would partially mediate the relationship between self-reliance and CRC screening adherence (i.e., stool blood test [FOBT or FIT] in the past year or endoscopy [sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) while controlling for age, race, and education level. To test this hypothesis, the indirect effect of self-reliance on CRC screening adherence through trust in PCP was calculated using the bootstrapping method in the PROCESS macro (indirect effect = 0.0091, SE = 0.0480, p = 0.8388, 95% CI = -0.0791 to 0.1205; see Tables 5 and 7). As shown in Figure 6, trust in PCP did not mediate the relationship between self-reliance and CRC screening adherence. The only significant path in this model was a negative relationship between self-reliance and trust in PCP (B = -0.3104, p = 0.005, 95% CI = -0.5241 to -0.0967).

Aim 3 Results

Examine potential moderators of relationships specified in the models proposed in Aim #2 while controlling for demographic covariates.

Hypothesis 3.1 posited that age would moderate the strength of the relationship between cancer fear and CRC screening adherence such that the relationship would be weaker with increasing age while controlling for race and education level. To test this hypothesis, a conditional process model was examined using the PROCESS macro. As shown in Figure 7, results indicated that age did not moderate the relationship between cancer fear and CRC screening adherence (index of moderation mediation = 0.0024, SE = 0.0061, 95% CI = -0.0050 to 0.0232; see Tables 8 and 9). There were no significant paths in the model.

Regarding Hypothesis 3.2, it was suggested that race would moderate the strength of the relationship between trust in PCP and CRC screening adherence such that the relationship would be stronger among African Americans compared to Whites while controlling for age and education level. The PROCESS macro was again used to test this conditional process model. As shown in Figure 8, race did not moderate the relationship between trust in PCP and CRC screening adherence (index of moderation mediation = -0.0241, SE = 0.1268, 95% CI = -0.3176 to 0.2058; see Tables 8 and 10). The only significant path in the model was a negative relationship between self-reliance and trust in PCP (B = -0.3143, SE = 0.1078, p = 0.0038, 95% CI = -0.5264 to -0.1023).

Hypothesis 3.3 posited that length of patient-provider relationship would moderate the strength of the relationship between trust in PCP and CRC screening adherence such that the relationship would be stronger with increasing length of patient-

provider relationship while controlling for age, race, and education level. As shown in Figure 9, results of analyses using the PROCESS macro indicated that length of patient-provider relationship did not moderate the relationship between trust in PCP and CRC screening adherence (index of moderation mediation = -0.0005, SE = 0.0013, 95% CI = -0.0036 to 0.0018; see Tables 8 and 11). The only significant path in the model was a negative relationship between self-reliance and trust in PCP (B = -0.3104, SE = 0.1086, *p* = 0.0046, 95% CI = -0.5241 to -0.0967).

Aim 4 Results

Examine the extent to which three aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) are associated with CRC screening behavior, controlling for the effects of variables recognized as significant predictors of CRC screening in prior research (i.e., White race, older age, higher education level, physician recommending CRC screening, family and friends recommending CRC screening).

Hypothesis 4.1 suggested that three aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) would predict CRC screening adherence above and beyond the predictive value of race, age, education, physician recommending CRC screening, and family/friend recommending CRC screening. To test this hypothesis, a hierarchical logistic regression analysis was conducted with four variables entered on the first step (i.e., race, age, education, physician recommending CRC screening, and family/friend recommending CRC screening) and the three masculinity variables entered on the second step. Results did not support Hypothesis 4.1 (see Table 12). Furthermore, physician recommendation for CRC screening and age were the only

significant predictors of CRC screening adherence in the model. Specifically, lack of physician recommendation for CRC screening (B = -2.677, $p < 0.001$, 95% CI = 0.022 to 0.212) and increasing age (B = 0.084, $p < 0.001$, 95% CI = 0.382 to 1.096) were associated with CRC screening adherence.

Aim 5 Results

Examine associations between three aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) and CRC screening status (i.e., non-adherence, adherence with stool blood test [FOBT or FIT in the past year], or adherence with endoscopy [sigmoidoscopy in the past 5 years or colonoscopy in the past 10 years]) in male VA primary care patients aged 51-75 while controlling for age, race, and education level.

A multinomial logistic regression analysis was conducted to address this exploratory aim. As shown in Table 13, none of the masculinity variables (i.e., heterosexual self-presentation, risk-taking, and self-reliance) were predictive of CRC screening adherence. When examining adherence to endoscopy, older age (B = 0.082, $p < 0.001$, 95% CI = 1.040 to 1.134) and higher levels of education were significant predictors of this outcome (B = 0.565, $p = 0.028$, 95% CI = 1.064 to 2.908), whereas, when examining adherence to a stool blood test, none of the examined variables were predictive of this outcome. Of note, SPSS produced an error message when completing this analysis which was likely related to the small number of participants adherent to

CRC screening guidelines with stool blood test only (n = 17) (Rand, personal communication, September 19, 2014). Thus, caution when interpreting the results of this analysis is warranted.

Given the small number of participants adherent to CRC screening guidelines with stool blood test only, an additional logistic regression analysis was conducted after omitting data from these individuals. This analysis examined the extent to which three aspects of masculinity (i.e., heterosexual self-presentation, risk-taking, and self-reliance) predicted adherence to endoscopy while controlling for age, race, and education level. In this model, none of the masculinity variables were predictive of endoscopy status. Instead, this status was only associated with age (B = 0.086, p < 0.001, 95% CI = 1.042-1.138) and education level (B = -0.580, p = 0.024, 95% CI = 0.339-0.926) (see Table 14). Specifically, increasing age and lower levels of education were associated with completion of CRC screening with endoscopic tests.

To summarize the relations of covariates to CRC screening adherence across analyses, age and race showed consistent relationships with this outcome, whereas education did not. Specifically, older age was associated with increased likelihood of CRC screening adherence and race was uncorrelated with this outcome across all analyses. Higher levels of education were only related to increased CRC screening adherence in bivariate correlational analyses and the multinomial logistic regression analysis which created the error message. Conversely, in the majority of regression analyses, lower levels of education were related to increased likelihood of CRC screening adherence.

DISCUSSION

Summary of Study Results

Colorectal cancer is the third most common cause of cancer deaths and yet, CRC screening rates are suboptimal among men in the United States (American Cancer Society, 2014a; American Cancer Society, 2014b). With improved understanding of barriers to CRC screening adherence, interventions can be designed to address these barriers, increase CRC screening rates, and decrease mortality from CRC. In the present study, masculinity beliefs were examined as potential barriers to men's CRC screening adherence because qualitative studies have provided suggestive evidence of this relationship (Bass et al., 2011; Beeker et al., 2000; Getrich et al., 2012; Goldman et al., 2009; Harvey & Alston, 2011; Holt et al., 2009; Jilcott Pitts et al., 2013; Jones, Devers, et al., 2010; Rivera-Ramos & Buki, 2011; Thompson et al., 2011; Wackerbarth et al., 2005; Winterich et al., 2009).

The primary aim of this study was to test the hypothesis that the masculinity variables of heterosexual self-presentation, self-reliance, and risk-taking would be inversely associated with CRC screening adherence. These three masculinity variables were chosen because prior qualitative research and masculinity theory suggest the following: 1) masculine men should present themselves as heterosexual and, by extension, distain cancer screening involving the rectum (e.g., colonoscopy) which could

affect their perceptions of their sexuality (Brannon, 1976; Getrich et al., 2012; Harvey & Alston, 2011; Holt et al., 2009; Jones, Devers, et al., 2010; Thompson et al., 2011; Winterich et al., 2011); 2) men with higher levels of risk-taking beliefs may not perceive disease such as CRC to be a threat to their well-being and, thus, may not engage in preventive behaviors such as CRC screening (Bem, 1974; Courtenay, 2000a, 2000b, 2011; Millar & Houska, 2007; Nicholas, 2000); and 3) men who endorse self-reliance ideals may not consistently receive health care, which limits their opportunity to receive a recommendation for CRC screening (Boman & Walker, 2010; Hammond, Matthews, & Corbie-Smith, 2010; Iwamoto et al., 2011; Locke & Mahalik, 2005; Mahalik et al., 2006; Mahalik et al., 2003; Pachankis et al., 2011; Pleck et al., 1993; Wade, 2009).

Contrary to the primary study hypothesis, none of these masculinity variables were significantly associated with CRC screening adherence in bivariate correlational or logistic regression analyses controlling for established predictors of the outcome. Specifically, these three aspects of masculinity failed to predict CRC screening adherence above and beyond the predictive value of race, age, education, physician recommendation, and family/friend recommendation. However, results suggested that lack of physician recommendation for CRC screening and increasing age were associated with a higher likelihood of CRC screening adherence.

A multinomial logistic regression analysis also was used to examine the extent to which the three aspects of masculinity predicted stool blood test screening (relative to non-adherence) and endoscopic screening (relative to non-adherence) while controlling for age, race, and education level. However, only 17 individuals in the sample were adherent to CRC with stool blood test alone, and the statistical software produced an

error message. Due to the small number of participants adherent to CRC screening guidelines with stool blood test alone, a final logistic regression analysis was conducted after omitting data from these individuals. This analysis examined the extent to which the three masculinity variables predicted endoscopic screening relative to non-adherence. Results showed that none of the masculinity variables predicted endoscopic screening.

In addition, analyses were conducted to test mediational and moderated mediational models of the relationships between two aspects of masculinity (i.e., risk-taking and self-reliance) and CRC screening adherence. The following models were hypothesized: 1) cancer fear would partially mediate the relationship between risk-taking and CRC screening adherence; 2) trust in PCP would partially mediate the relationship between self-reliance and CRC screening adherence; 3) age would moderate the strength of the relationship between cancer fear and CRC screening adherence; 4) race would moderate the strength of the relationship between trust in PCP and CRC screening adherence; and 5) length of patient-provider relationship would moderate the strength of the relationship between trust in PCP and CRC screening adherence. Mediation and moderated mediation analyses did not support any of the five hypothesized models; however, a significant negative relationship was found between self-reliance and trust in PCP.

Regarding study covariates, increasing age was associated with a higher likelihood of CRC screening adherence, and race was unrelated to this outcome across all analyses. In addition, level of education (i.e., whether one had a history of college attendance) was inconsistently associated with adherence to CRC screening. In multiple regression analyses, lower levels of education was a significant predictor of CRC

screening adherence. However, in one of the regression analyses (i.e., the multinomial logistic regression analysis which produced an error message), mediation and moderated mediation analyses, and the bivariate correlational analysis, higher levels of education were associated with CRC screening adherence. In yet another regression analysis, level of education was not a significant predictor of CRC screening adherence. Potential explanations for study findings are provided below.

Fit with Existing Literature

Results of qualitative studies suggest that masculinity beliefs may be related to men's willingness to undergo endoscopic CRC screening (Bass et al., 2011; Beeker et al., 2000; Getrich et al., 2012; Goldman et al., 2009; Harvey & Alston, 2011; Holt et al., 2009; Jilcott Pitts et al., 2013; Jones, Devers, et al., 2010; Rivera-Ramos & Buki, 2011; Thompson et al., 2011; Wackerbarth et al., 2005; Winterich et al., 2009). To the author's knowledge, prior quantitative studies have not examined associations between masculinity beliefs and CRC screening. The present findings suggest that three masculinity beliefs (i.e., heterosexual self-presentation, risk-taking, and self-reliance) may not in fact be associated with CRC screening adherence. However, previous research suggests that two of these facets of masculinity (i.e., heterosexual self-presentation and self-reliance) are related to other health behaviors in men (Hammond, Matthews, Mohottige et al., 2010; Mahalik, Levi-Minzi, & Walker, 2007; Levant, Wimer, & Williams, 2011; Parent, Torrey, & Michaels, 2012). For example, heterosexual self-presentation was negatively associated with HIV testing among men who have sex with men (Parent, Torrey, & Michaels, 2012). In addition, in a study of

adult men aged 18-78, the masculinity subscales of self-reliance, violence, and playboy predicted health risk behaviors (e.g., unhealthy lifestyle choices and substance use), whereas other masculinity subscales (e.g., risk-taking, heterosexual self-presentation) did not predict these behaviors (Mahalik, Levi-Minzi, & Walker, 2007; Levant, Wimer, & Williams, 2011). Another study of self-reliance in men produced counterintuitive findings; greater self-reliance was associated with more prompt receipt of cholesterol screening (Hammond, Matthews, Mohottige et al., 2010). In addition, self-reliance was unrelated to the receipt of blood pressure screening or a routine medical check-up (Hammond, Matthews, Mohottige et al., 2010). Thus, given the limited research to date, a clear pattern of associations between the masculinity ideals of self-reliance and heterosexual self-presentation and health behaviors has not emerged.

Although theory suggests that adherence to the masculinity ideal of risk-taking might lead to decreased worry about health and less engagement in healthy behaviors (Brannon, 1976; Courtenay, 2011; Nicholas, 2000; Parent & Moradi, 2009; Walker, Tokar, & Fischer, 2000), risk-taking has not been found to be associated with preventive health behaviors in men (Hammond, Matthews, Mohottige et al., 2010; Mahalik, Levi-Minzi, & Walker, 2007; Levant, Wimer, & Williams, 2011; Parent, Torrey, & Michaels, 2012). Thus, findings of the current study are consistent with prior empirical literature, but do not support masculinity theory (Brannon, 1976; Courtenay, 2000a, 2000b, 2011). It is important to note that the risk-taking ideal has been measured with items such as “I take risks” and “I frequently put myself in risky situations” (Parent & Moradi, 2009). Thus, a willingness to take risks rather than beliefs about vulunerability to health risks is the construct under examination in the current study and prior research. Developing

masculinity measures which assess perceived risk and vulnerability to disease or poor health would allow further testing of masculinity theory. Further research is also needed to assess whether the masculinity ideal of risk-taking is more strongly associated with risky health behaviors than a lack of preventive health behaviors among men. Indeed, in one study of men, adherence to the risk-taking ideal was associated with drinking alcohol to intoxication (Iwamoto et al., 2011).

It is also possible that masculinity ideals not considered in the current study, such as the primacy of work and pursuit of status, may be associated with CRC screening behaviors. To date, studies have found variable associations between a range of masculinity ideals and health behaviors in men. For example, in one study, the masculinity ideals of primacy of work and dominance were positively associated with preventive health behaviors (i.e., testicular self-exam, skin cancer self-exam, and an annual physical exam), whereas the pursuit of status was negatively associated with these behaviors (Levant, Wimer, and Williams, 2011). However, other masculinity ideals (e.g., self-reliance, disdain for homosexuality, violence) were not associated with these health behaviors (Levant, Wimer, and Williams, 2011). The authors also found variable associations between aspects of masculinity and health risk behaviors, which led them to conclude the following:

> the relationship between health behavior and masculine gender socialization varies according to specific dimension of health behavior and the specific masculine gender socialization construct. It seems from these data and prior research that some facets of masculinity are associated with health protective factors, whereas others are associated with health risk factors (Levant, Wimer, and Williams, 2011, pg. 26).

Thus, the relationship between aspects of masculinity and health behaviors in men is quite complex such that further theory development and multi-faceted assessment of constructs are needed. Unfortunately, many studies use a total masculinity score rather than subscale scores, which limits theoretical progress and comparisons between the current study and prior studies (Boman & Walker, 2010; Mahalik & Burns, 2011; Mahalik, Burns, & Syzdek, 2007; Springer & Mouzon, 2011).

Potential mediators of relationships between masculinity variables and CRC screening adherence also were examined in this study. Contrary to hypotheses, cancer fear did not partially mediate the relationship between risk-taking and CRC screening adherence. Masculinity theory suggests that men who hold risk-taking beliefs may not feel that CRC or other diseases are a threat to their well-being (Courtenay, 2000a, 2000b, 2011; Nicholas, 2000). In addition, due to beliefs regarding the importance of suppressing emotions, it may be that men adhering to risk-taking and other masculinity ideals are not willing to endorse emotions such as fear (Brannon, 1976; Millar & Houska, 2007; Parent & Moradi, 2009; Walker, Tokar, & Fischer, 2000).

To the author's knowledge, the relationship between the masculinity ideal of risk-taking and cancer fear has not been previously examined among men. Regarding the relationship between fear and cancer screening, prior studies have revealed mixed results, largely depending upon whether general cancer fear, fear of a specific cancer type (e.g., breast cancer fear), or trait fear was examined (Consedine, 2012; Consedine et al., 2004; Consedine et al, 2006; Hay, Buckley, & Ostroff, 2005; Kleier, 2010). Additionally, many studies of cancer fear have featured female participants (Consedine et al., 2004; Hay, Buckley, & Ostroff, 2005) and, to the author's knowledge, none have examined CRC

screening. Although general cancer fear has been positively associated with other types of cancer screening (Consedine et al., 2004), it was not associated with CRC screening adherence in this study. It is possible that these variables are not related, or that CRC-specific fear may be more closely related to CRC screening behavior.

The null mediation finding with respect to cancer fear has several potential explanations. First, it is possible that other variables (e.g., cancer fatalism, comfort with receipt of CRC screening test procedures or lack of embarrassment, perceptions of normative health behaviors, and negative attitudes toward accessing healthcare) may better account for the relationship between risk-taking and CRC screening status than cancer fear (Consedine, Ladwig, Reddig, & Broadbent, 2011; Consedine, Reddig, Ladwig, & Broadbent, 2011; Levant et al., 2013; Mahalik, Burns, & Syzdek, 2007; Shelton et al., 2011). These potential mediators were not assessed in the current study and deserve consideration for future research. In addition, the analyses may have lacked statistical power to detect mediation due to lower numbers of non-adherent individuals in the sample.

Also contrary to hypotheses, age did not moderate the strength of the relationship between cancer fear and CRC screening adherence. It was hypothesized that cancer fear would be a weak predictor of CRC screening among older participants based on prior research with cancer survivors in which fear of death and fear of cancer recurrence showed inverse associations with age (Cicirelli, 2006; Crist & Grunfeld, 2013; Lebel, Beattie, Arès, & Bielajew, 2013; Ziner et al., 2012). To the author's knowledge, age has not been examined as a moderator of relationships between fear and any type of cancer screening in prior research. However, in a recent study, greater fear of a CRC diagnosis

predicted non-receipt of CRC screening among older, but not younger adults in Spain (e.g., age 50-59 vs. 60 and over) (Molina-Barceló, Salas-Trejo, Peiró-Perez, Vanaclocha, Pérez, & Castán, 2014). Thus, the extent to which age moderates the relationship between cancer fear and cancer screening deserves further study. Although not considered as moderators in prior literature, it is also possible that other variables may moderate the relationship between cancer fear and CRC screening (e.g., perceived risk of CRC, family history of CRC screening, prior physician recommendation for CRC screening, self-efficacy for test completion) (Beydoun & Beydoun, 2008; Brouse et al., 2008; Centers for Disease Control and Prevention, 2012b; Farmer et al., 2008; Friedman et al., 2004; Guessous et al., 2010; Halbert et al., 2011; Honda, 2004; Jandorf et al., 2010; Kremers et al., 2000; Myers et al., 1994; Post et al., 2008; Tabbarah et al., 2005; Tessaro et al., 2006). Given variability in the relationship between fear and cancer screening, exploring potential moderators of this relationship is an important direction for future research (Consedine, 2012; Consedine et al., 2004; Consedine et al, 2006; Hay, Buckley, & Ostroff, 2005; Kleier, 2010).

This study also examined whether trust in PCP accounted for the relationship between the masculinity ideal of self-reliance and CRC screening adherence. Masculinity theory suggests that men who endorse self-reliance ideals may avoid healthcare services and therefore may not have the opportunity to develop a relationship of trust with a healthcare provider and receive a recommendation for CRC screening (Boman & Walker, 2010; Hammond, Matthews, & Corbie-Smith, 2010; Iwamoto et al., 2011; Locke & Mahalik, 2005; Mahalik et al., 2006; Mahalik et al., 2003; Pachankis et al., 2011; Pleck et al., 1993; Wade, 2009). Indeed, a negative relationship between self-

reliance and trust in one's PCP was found in the current study, suggesting that men who believe that "real men" should be self-reliant may be less likely to trust a healthcare provider. However, in the current study, trust in PCP was not associated with CRC screening adherence, which contrasts with prior findings among low-income, non-veteran patients (Greiner et al., 2005). Also, contrary to hypotheses, trust in PCP did not partially mediate the relationship between self-reliance and CRC screening adherence. These null findings may have been due, in part, to a restriction of range in the trust in PCP variable with most participants endorsing a high level of trust in their provider. As the study took place immediately prior to a primary clinic appointment, it is possible that participants did not feel comfortable revealing low levels of trust in their provider. In addition, veterans who were seeing a provider for the first time on the date of consent may have been reporting their level of trust in the healthcare system in general or a previous provider, which may have influenced study results. Additionally, other variables associated with CRC screening adherence in prior literature such as comfort with receiving a physical examination (e.g., lack of embarrassment) or self-efficacy for test completion may better explain the relationship between self-reliance and CRC screening adherence (Consedine, Ladwig, Reddig, & Broadbent, 2011; Consedine, Reddig, Ladwig, & Broadbent, 2011; Halbert et al., 2011; Kremers et al., 2000; Myers et al., 1994; Tessaro et al., 2006). Furthermore, it is possible that trust in PCP was mediating the relationship between self-reliance and CRC screening adherence, but the analyses may have lacked statistical power to detect mediation due to lower numbers of non-adherent individuals in the study.

Contrary to hypotheses, race did not moderate the strength of the relationship between trust in PCP and CRC screening adherence. It was hypothesized that race might affect the relationship between trust in PCP and CRC screening; specifically, it was expected that the relationship between trust in PCP and CRC screening would be stronger among African Americans compared to Whites. Especially among ethnic minority populations, lack of trust in the healthcare system has been indicated as a barrier to receiving preventive health services (Fyffe, Hudson, Fagan, & Brown, 2008; Greiner, Born, Nollen, & Ahluwalia, 2005; Hammond, Matthews, Mohottige, Agyemang, & Corbie-Smith, 2010; Jones, Devers, et al., 2010). However, this study and prior research have not supported this hypothesis. For example, in one study, race (African American vs. White) and trust in PCP did not significantly interact to predict receipt of prostate-specific antigen tests (Musa et al., 2009). In the current study, several factors may have reduced statistical power for testing moderation, including the relatively small sample of African Americans and range restriction with respect to the trust in PCP variable. In addition, other variables not previously considered as moderators may affect the relationship between trust in PCP and CRC screening adherence (e.g., patient-provider racial concordance, patient-provider gender concordance) (Bonds, Foley, Dugan, Hall, & Extrom, 2004; Menees, Inadomi, Korsnes & Elta, 2005; Saha, Komaromy, Koepsell, & Bindman, 1999) and deserve exploration in future research.

Also contrary to hypotheses, length of patient-provider relationship did not moderate the strength of the relationship between trust in PCP and CRC screening adherence. Based upon patient trust theory which suggests that interpersonal trust in one's PCP is developed through multiple interactions with a PCP and evaluation of the

PCP's behavior throughout these interactions (Pearson & Raeke, 2000), it was hypothesized that the relationship between trust in PCP and CRC screening would be stronger with increasing length of patient-provider relationship. To the author's knowledge, length of patient-provider relationship had not been previously examined as a moderator of the relationship between trust in PCP and health behaviors in any population. The current study findings suggest that length of patient-provider relationship may not moderate the relationship between trust in PCP and CRC screening. However, null findings may have been due to a restriction of range in the trust in PCP variable as well as the length of patient-provider relationship variable. For example, a physician who carried a large patient panel left the PCP clinic soon after the current study began. Thus, many patients had only recently begun seeing their current provider. Specifically, 50 participants were scheduled for their initial PCP visit at the time of consent. In addition, 28 participants did not have a current PCP assigned at the time of consent. All of these contextual factors might have affected the relationships among study variables.

Relationships between study covariates (i.e., age, education level, and race) and CRC screening adherence also were examined. As has been demonstrated in prior literature (Beydoun & Beydoun, 2008; Cokkinides et al., 2003; Tessaro et al., 2006), increasing age was associated with a greater likelihood of being adherent to CRC screening guidelines. Older individuals may have had more opportunities to receive CRC screening and may have had increased awareness of their risk for CRC. Contrary to prior literature (Beydoun & Beydoun, 2008; Cokkinides, Chao, Smith, Vernon, & Thun, 2003; Halbert et al., 2011), lower levels of education were associated with a higher likelihood

of CRC screening adherence in the majority of regression analyses. However, higher levels of education were associated with an increased likelihood of CRC screening in bivariate analyses and the mediation and moderated-mediation models. Of note, the use of the bootstrapping method as well as the inclusion of other variables in the models may have contributed to a change in the direction of the association between education level and CRC screening adherence across mediation analyses. In addition, race was not a significant predictor of CRC screening adherence in regression analyses or bivariate analyses. If the current study had included veterans accessing healthcare services as well as those not currently accessing healthcare services, race may have been more predictive of CRC screening adherence. Among veterans, race and CRC screening adherence have shown differential associations across studies (Burgess et al., 2011; Dolan et al., 2005). For example, in a mail-based study of African American and White veterans from 24 different VA Medical Centers, White race was associated with CRC screening adherence prior to controlling for other demographic and cognitive variables (Burgess et al., 2011). Conversely, in a study of veterans accessing services in a VA primary care clinic, African Americans were more likely to adhere to CRC screening guidelines than Whites (Dolan et al., 2005). Interestingly, in the former study, CRC screening adherence rates were higher among Whites who were married and well-educated and higher among African Americans who were unmarried and had lower levels of education (Burgess et al., 2011). Thus, the examination of demographic subgroups (e.g., interactions between race and marital status) may be informative in future research which features larger samples of ethnic minority individuals.

Furthermore, the relationships between CRC screening adherence and physician recommendation and family or friend recommendation for CRC screening were examined, as these variables have been associated with CRC screening adherence in previous studies (Gilbert & Kanarek, 2005; Taylor et al., 2003). Consistent with prior literature (Gilbert & Kanarek, 2005; Taylor et al., 2003), bivariate analyses suggested a positive association between CRC screening adherence and physician recommendation for CRC screening. However, physician recommendation was negatively associated with CRC screening adherence in one set of regression analyses. These findings may be have been due to the use of the bootstrapping method and the presence of other variables in the model. Family and friend recommendation for CRC screening showed a significant, positive association with CRC screening adherence in bivariate analyses, but was not a significant predictor in the regression analyses. In prior research, family or friend encouragement for receiving CRC screening has been associated with greater odds of being at a higher stage of adoption for both FOBT and colonoscopy (Wang et al., 2014). In addition, greater perceived family member or friend support for CRC screening predicted CRC screening adherence in men and women attending Appalachian churches (Tessaro et al., 2006). However, in a study conducted among low-income and predominantly African-American individuals who were non-adherent to CRC screening guidelines at the time of receiving a CRC screening intervention, there was no significant relationship between family member or friend recommendation for CRC screening and CRC screening behavior (Brouse et al., 2008). Social factors (e.g., marital status, number and quality of friendships) might help explain variability in relationships between family/friend CRC screening recommendation and screening behaviors. Of note, in the

current study, a lower percentage of men were married compared to the general population of men of their age (U.S. Census Bureau, 2012), and being married has been a significant predictor of CRC screening in prior literature (Guessous et al., 2010). Future studies might consider the closeness of the relationship as well as the type of relationship (e.g., spouse, child, friend, sibling) between the patient and the person who has recommended CRC screening when predicting CRC screening adherence.

Potential Explanations for Study Results

Several sample characteristics may have contributed to null study results. First, study participants were veterans accessing primary care services within a VA hospital. Veterans represent a unique sector of the United States population in that those with an honorable discharge from the military are eligible for low-cost or free healthcare services at VA Medical Centers (Morgan, Teal, Reddy, Ford, & Ashton, 2005). Compared to the general population of adults in the U.S. and veterans who do not access healthcare through the VA system, veterans accessing care at VA Medical Centers are less likely to be employed and are more likely to be older, to self-identify as African American, to have lower levels of income and education, and to have more medical and mental health diagnoses (Morgan et al., 2005). Furthermore, veterans accessing healthcare services may differ from those unwilling to see a PCP with respect to masculinity beliefs and other characteristics. If the present study had been conducted among individuals who were not currently accessing healthcare services or those who had not seen a PCP for preventive care in the past several years, results may have revealed different relationships between study variables (e.g., masculinity beliefs, trust in PCP, and CRC screening

adherence). In addition, there was a restriction of range in responses to two of the three masculinity subscales, as few men had masculinity scores at the upper end of the scale. For example, the mean score on the self-reliance scale was 1.24 and the highest mean score was 2.40, although the scale maximum is 3.0. Similarly, the mean score on the risk-taking scale was 1.10, with few individuals reporting the maximum score of 3.0. Of note, the sample consisted of middle-age and older men (i.e., 51-75 years), and masculinity beliefs have been found to decline with increasing age (Terracciano, McCrae, & Costa, 2006). Declining masculinity beliefs with increasing age may be due to poorer health and greater dependency on health care and other services to fulfill one's needs. Finally, it is possible that study refusals or missing data may have been related to literacy and/or health literacy issues; however, literacy and health literacy were not assessed during the study.

Study findings may also be related to several VA system-level factors. First, in recent years, there has been a system-wide emphasis on increasing CRC screening adherence rates among veterans (Chao et al., 2009; Jackson et al., 2010). A successful national initiative to improve CRC screening rates at VA Medical Centers in the last several years included electronic medical record reminders as well as performance incentives for physicians (Chao et al., 2009). These efforts may have led to increased patient awareness of CRC screening which may have impacted screening rates, making it more difficult to recruit non-adherent individuals. Lower numbers of non-adherent veterans in this study may have reduced statistical power for detecting effects. Furthermore, men who continue to be non-adherent in the VA healthcare system may differ on important characteristics from non-adherent men who do not access VA

services. Another VA system-level factor that may have influenced study results was recruitment for a large, national randomized controlled trial comparing the efficacy of the FIT test to colonoscopy in the same primary care clinics as the current study. The ongoing recruitment for that study may have influenced our consent rates and study results. Specifically, some veterans may have confused the nature of the current study (i.e., study questionnaire only) versus the randomized controlled trial (i.e., intervention with CRC testing), which may have reduced the consent rate. It is also possible that, among veterans who were non-adherent to CRC screening, those who declined the current study held different beliefs about CRC screening or other study variables than those who agreed to participate. A third system-level factor potentially influencing study results is that many individuals had experienced a recent change in their PCP. Some participants had recently begun to receive care at the VA, whereas others had recently switched providers within the hospital. During the study, one long-time PCP with a large patient panel left the main clinic where recruitment took place, and his patients were either without a listed PCP or had been recently transferred to other providers whom they may or may not have met previously. Indeed, for 50 participants, the date of consent was their first visit to the provider, and 28 participants were not yet assigned to a regular PCP at the time of consent. Thus, a change in providers may have contributed to null findings in this study, such as the lack of relationship between trust in one's PCP and CRC screening adherence.

Furthermore, study design issues may have influenced study results. First, the research assistants for the study were both female. The gender of the research assistants may have led to lower levels of consent among some men as well as socially desirable

responses from study participants. Prior research has demonstrated that the gender of research assistants conducting study interviews may influence participant responses (Davis, Couper, Janz, Caldwell, & Resnicow, 2010). Specifically, in prior research about gender roles and characteristics (e.g., masculinity and femininity), response biases that were "more socially progressive responses or responses that deferred to the interviewer's gender" were revealed among participants of both genders responding to male versus female interviewers (Davis, Couper, Janz, Caldwell, & Resnicow, 2010, p. 22). For example, one telephone survey found that male participants who were more highly educated and reported being low in power in their romantic relationship endorsed more liberal gender role views to a female research assistant than those interviewed by a male research assistant (Lueptow, Moser, & Pendleton, 1990). It is unclear whether or how the gender of research assistants in the current study may have influenced responses to the masculinity variables. Although the questionnaire was self-administered, the informed consent process was conducted in-person, and participants gave their paper questionnaire directly to the female research assistant. One veteran who refused to participate in the study mentioned his discomfort with discussing the topic of CRC screening with a female research assistant.

In addition, despite the confidential nature of the study, participants may not have felt comfortable providing honest responses to the masculinity questions which broached potentially sensitive topics (e.g., beliefs about power over women and heterosexual self-presentation). Multiple participants wrote comments such as "I'm not gay" in the margins of the survey near the heterosexual self-presentation masculinity subscale items demonstrating awareness (and perhaps concern) that their responses would be reviewed.

Second, the study was conducted in the primary care clinic just prior to the patient's visit with his provider, which may have resulted in response biases. As noted previously, there was a restriction of range in the trust in PCP variable, with the majority of individuals indicating high levels of trust in their healthcare provider. Third, in addition to using medical record review, the current study relied upon self-report measures of CRC screening adherence, which may have contributed to reponse biases and inaccuracies. There were 56 instances of incongruence between the medical record and self-reported CRC screening status. Specifically, 46 participants reported that they were up-to-date with CRC screening which was not supported by medical record documentation, and 10 participants reported that they were non-adherent which was not supported by medical record documentation.

Measurement issues may have also influenced study results. First, the current masculinity scale was not initially validated in samples of older adults or veterans. Instead, the masculinity scale had been normed with male college students (Parent & Moradi, 2009; Parent & Moradi, 2011; Parent, Moradi, Rummell, & Tokar, 2011) who may respond differently to items as compared to older male veterans. However, the questionnaire has subsequently been administered to both undergraduate and community-dwelling men aged 18 to 63 (Levant & Wimer, 2014a), men aged 22 to 78 who have sex with men (Parent, Torrey & Michaels, 2012), and men and women aged 18 to 83 (Parent & Smiler, 2013). To the author's knowledge, the present study represents the first time that the masculinity scale was administered to veterans. In addition, the masculinity scales assessed general masculinity beliefs without referring to masculinity in relation to a healthcare context. For example, the scales do not assess masculinity beliefs related to

screening tests or medical services which breach physical boundaries. These beliefs may be more proximal to CRC screening behavior. For example, if the current study had utilized an item such as "a colonoscopy can affect masculinity" (modified from an item designed by Paiva et al., 2011), a significant relationship between CRC screening adherence and this belief may have been found. Taken together, characteristics of the measures, sample, VA system, and study design may have affected the response rate, accuracy of study data, and ability to attain statistical significance.

Limitations

Limitations of this study should be noted. First, the study features a cross-sectional design and, thus, causal relationships and changes in beliefs and behaviors over time could not be examined. Indeed, it may be that study variables such as masculinity beliefs and CRC screening adherence would be correlated longitudinally, although they were not related in this cross-sectional study. Second, veterans who agreed to participate in this study may have differed in important ways from those who declined participation, especially with respect to CRC screening adherence. These differences may have contributed to less variability in responses to study questionnaires. However, the percentage willing to undergo eligibility screening (73% of those approached) was comparable to that of prior research on veterans' CRC screening adherence. For example, a cross-sectional survey on CRC screening among non-adherent veterans conducted in clinic yielded a 74% participation rate (Dolan et al., 2004). Another study of CRC screening conducted via mailed survey yielded a slightly higher participation rate

of 81% with differential response rates between African American and White VA patients (i.e., 73% for African American veterans and 89% for White veterans).

Third, variables which may be related to masculinity ideals, such as willingness to access healthcare services, perceptions of normative health behaviors, perceived barriers to accessing healthcare, self-efficacy, and gender role stress were not included in study analyses (Levant & Wimer, 2014b; Mahalik, Burns, & Syzdek, 2007). Indeed, a recent study demonstrated that general self-efficacy and perceptions of normative health behaviors partially mediated the relationships between masculinity ideals (i.e., the CMNI-46 total score which includes 9 masculinity beliefs) and health behaviors (i.e., Health Behavior Inventory-20 total score which includes a range of health-promoting and health-risk behaviors) (Levant & Wimer, 2014b; Levant, Wimer, & Williams, 2011). Fourth, the study relied upon self-report measures. It is possible that participants provided inaccurate responses due to social desirability, poor literacy, or, more specifically, poor health literacy; however, CRC screening tests were described in layperson's terms on the study questionnaire. Fifth, participants' medical comorbidities were not assessed, as the relationship between comorbidities and CRC screening has been inconsistent (Fleming et al., 2011; Lukin et al., 2012). However, comorbidity coupled with increasing age may affect whether a patient receives a CRC screening recommendation as well as the test modality (i.e., FOBT or FIT vs. colonoscopy) recommended by his PCP (Haggstrom, Klabunde, Smith, & Yuan, 2013). In addition, of note, a lower percentage of men in the current study reported being married compared to men in the United States population of similar age (e.g., 55% in the current study vs. 70-78% for United States men age 45-74) (U.S. Census Bureau, 2012). The relationship

between marital status and CRC screening adherence was not examined in the current study. However, in multiple prior studies, being married has generally been associated with CRC screening adherence, but has not consistently predicted this outcome (Guessous et al., 2010; Patel et al., 2013; Shires et al., 2011; van Jaarsveld, Miles, Edwards, & Wardle, 2006; Weiss et al., 2013).

Sixth, general cancer fear rather than CRC-specific fear was assessed. Furthermore, fear of CRC screening methods was not measured, which has been predictive of screening behavior in prior studies (Jibara, Jandorf, Fodera, DuHamel, 2011; Lee, Consedine, & Spencer, 2011). Finally, the majority of the sample self-identified as White, and the sample was limited to male veterans who were engaged in PCP services and receiving their care at a single Midwestern VAMC, which limits generalizability to dissimilar populations. Veterans represent a unique population of individuals who, depending upon their circumstances, have access to PCP and CRC screening services at little or no cost. Thus, findings may not generalize to non-veterans, men who do not have a regular PCP or readily available access to CRC screening services, women, and those from racial minority groups.

Future Research Directions and Recommendations

Based on the study findings, a number of future research directions warrant consideration. First, in order to test masculinity theory in a healthcare context, measures assessing masculinity beliefs as they relate to the receipt of healthcare services, including CRC screening, should be developed (e.g., items such as “a real man does not allow a doctor to exam his body” or “a real man does not let a doctor insert objects into his

rectum as part of a medical test"). As noted previously, the current masculinity measure assessed general beliefs that may be less predictive of CRC screening adherence or medical care use compared to more specific masculinity beliefs related to healthcare.

Second, longitudinal studies are needed to assess potential changes in masculinity beliefs as men age and their relationship to the use of healthcare services in VA and non-VA settings. In a longitudinal study of personality, scores on the masculinity scale of the Guilford-Zimmerman Temperament Survey were found to decline with increasing age in a linear fashion over a 42 year period among both men and women (Terracciano, McCrae, & Costa, 2006); however, this study was not conducted with veterans and correlates of this decline were not assessed. Masculinity beliefs theoretically associated with healthcare receipt (i.e., self-reliance, heterosexual self-presentation, risk-taking) may be expected to change as men access more health services. For example, as men place greater trust in their providers based upon more frequent interactions with them, a sense of self-reliance may decline.

In addition, the hypotheses of the current study should be tested in different populations. For example, the study should be conducted with a more ethnically diverse sample, as participants in the current study were generally White or African American. Future studies should recruit participants from other ethnic groups to assess whether between-group differences in relationships between masculinity beliefs and CRC screening adherence exist. In qualitiative studies, many of the men reporting concerns about the maintenance of masculinity in the context of invasive cancer testing were from minority groups (e.g., African American and Latino or Hispanic men) (Bass et al., 2011; Beeker et al., 2000; Getrich et al., 2012; Harvey & Alston, 2011; Holt et al., 2009;

Rivera-Ramos & Buki, 2011; Thompson et al., 2011; Winterich et al., 2009). Thus, research studies should examine masculinity beliefs and related cultural beliefs that may impact CRC screening adherence and other health behaviors in specific minority groups. In addition, this research should be extended to non-veterans and men who do not regularly use primary care services, as their masculinity beliefs and CRC screening adherence may differ from those of veterans who regularly use primary care services. Finally, further research is necessary to explore a range of theory-driven mediators and moderators of relationships between masculinity beliefs and CRC screening.

Conclusions

Qualitative studies have suggested that some men believe that medical tests involving the rectum may be an affront to commonly-held masculinity ideals. The current quantitative study aimed to examine the relationship between the masculinity beliefs of risk-taking, self-reliance, and heterosexual self-presentation and colorectal cancer screening behaviors among male veterans accessing primary care services. These masculinity variables were not significantly associated with CRC screening adherence in correlational and logistic regression analyses.

Results of the present study lead to a number of research questions to be examined in future research. Relationships between study variables should be examined in a population not actively accessing healthcare services. In addition, as mentioned, these research questions should be examined among specific minority groups (e.g., African-American and Latino men) to better understand relationships between study variables and cultural beliefs which may be associated with healthcare beliefs,

masculinity ideals, and health behaviors. Furthermore, future studies should include non-veteran samples, as their masculinity ideals and healthcare use beliefs and behaviors may differ from those of veterans. In addition, future studies should develop and utilize masculinity measures which assess beliefs more proximal to receiving CRC screening and other healthcare. Finally, prospective and longitudinal research studies are needed to better understand relationships among study variables.

If masculinity beliefs are found to be related to CRC screening adherence in future studies, gender-specific CRC screening interventions could be developed that address values important to men in order to foster CRC screening adherence (Friedemann-Sanchez et al., 2007). For example, men could receive tailored messages which encourage CRC screening in order to maintain masculinity norms that are important to them (e.g., maintain one's health in order to support one's family) (O'Brien, Hunt, & Hart, 2005). In addition, study findings could be applied to research regarding other preventive health behaviors among men.

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TABLES

Table 1. Quotations from qualitative studies reflecting masculinity norms and cancer screening involving the rectum

Quotation:	Participant characteristics if known:	Source:
…probing around in my rectum . . . [is] treading on my masculinity.	African-American man under age of 65	Beeker et al., 2000, p. 268
I think there's an aspect that people think it's gay and there's that whole sexual issue about it. If you're willingly to submit to doing this thing, you could never tell anyone about it. . .So I am wondering if it's part of this homosexual thing or this fear of having a digital rectal exam or having someone messing around your butt. Maybe I have some questions about my own sexuality, my own sexual orientation. What do I do if I like it? What if I find out something about myself while I'm having this exam? Or what if I have questions about myself, what if I'm insecure and that's what keeps me from going to have this exam. How do you address that insecurity if it's sexual identity or sexual orientation?	African-American man	Harvey & Alston, 2011, p. 147
Demeaning…[because] that's where you're most vulnerable.	Caucasian man	Winterich et al., 2011, p. 531
The myth about that type of procedure— they always relate it to a sexual encounter. You do not want nobody to fool around your butt because they might think they are bisexual.	African-American man	Holt et al., 2009, p. 881
…you know, guys are usually reluctant to have colonoscopies because I guess it is a male ego thing you know, having something inserted into your rectum.	African-American man	Bass et al., 2011, p. 124
…like a taboo. [People] don't want the doctor to insert the finger. That's what a lot of people have on their minds.	Mexican-American man	Getrich et al., 2012, p. 8
…compromised position…(where)…you're pretty much at the mercy of somebody.	Caucasian man	Winterich et al., 2011, p. 531
…biggest fear…someone placing something in my rectum, that's how most men are.	African-American man	Winterich et al., 2009, p. 6
You might want to call me old school…certain part of the body wasn't made for entrance in a man [laughs].	African-American man	Winterich et al., 2011, p. 531

Table 1, continued.

If you were a man, you didn't do that….Hey, you don't get any hand put up your butt.	African-American man	Harvey & Alston, 2011, p. 147
But the other thing is women are better than men, I'm afraid, at dealing with these things. Men are um (.) I was going to say phobic, if you like. I was going to take it one step further and [say] … homophobic, if you like, because, you know, you're talking about men's bottoms and that sort of thing. Do you know what I mean?	Man from New Zealand	Thompson et al., 2011, p. 9-10
It is not so much the worry. It is the intrusion part…It is just in my make up. It is an intrusion to keep having to go in a man's rectum.	African-American man	Bass et al., 2011, p. 124
I think it's problematic for men…especially homophobic men…they think you let someone do that to you, you ain't a real man.	Man from Virginia, USA	Jones, Devers, et al., 2010, p. 512
I'm sorry, I don't mean to interrupt, but let's get real. The myths about a lot of black males are that to protect that macho image, you don't have anybody messing around with your butt.	African-American man	Harvey & Alston, 2011, p. 147
[My friend] told me he had lost his manhood. So, we must be very careful with that because people think that they lose their manhood	Latino man	Rivera-Ramos & Buki, 2011, p. 20
[Men's] attitudes [toward the DRE] are not the best… because sometimes they do things that [physically] hurt more [than the DRE]. But, the fact is that it is an uncomfortable experience because they do it in a [body] part where it is not usual for a man to [get examined]. And yes, as liberal as I may be, I still do not like to be touched in that [body] part; even if it's once a year.	Latino man	Rivera-Ramos & Buki, 2011, p. 20
Just part of the body guys feel uncomfortable about.	Caucasian man	Winterich et al., 2009, p. 5
Men don't like for anyone to touch them there. The same goes for me. That's why I hadn't gone over there [in Mexico]. I spent lots of effort [there] protecting [my sexuality] just to give it up in the United States [laughs].	Man from Mexico living in the United States	Getrich et al., 2012, p. 8
An insult to my manhood….(And the reason that you don't like the finger test is because of the invasiveness?) Invasiveness, and maybe just call me homophobic. I don't play that. I'm the screwer, not the screwee.	African-American	Winterich et al., 2009, p.7

Table 1, continued.

Violated…men don't like for people going up in…the rectum… I'm a man, and I just don't feel, I don't feel comfortable like that!	African-American man	Winterich et al., 2009, p. 5
Something's up in your rectum would be kind of a compromised position for me.	Caucasian man	Winterich et al., 2009, p. 6
Certain parts of the body weren't made for entrance in a man.	African-American man	Winterich et al., 2009, p. 6
I think probably a lot of them feel the same way I do about it, it's not very comfortable, kind of embarrassing….(And why do you think they feel that way?)…I just think it's the way that men are probably brought up, and, you know, raised up as to…be exposed to another man like that in that kind of setting.	Caucasian man	Winterich et al., 2009, p. 7
I hate it. It's one of the most dangerous tests a doctor can give me. For him. (For him?) Yeah. Because it depends upon my mental state how I am going to respond to that test. Hopefully my mental state is analytical, scientific, and within control. I don't want it to be in my normal reaction of protection. Because I may be old but even old rattlesnakes can kill you (laughs).	African-American man	Winterich et al., 2009, p. 8
It's kind of always hard for macho guys, you know, shoving this thing up your butt, is not something that everyone really looks forward to.	Man from USA	Wackerbarth et al., 2005, p. 547
Most guys . . . the reason they don't have it [screening] is because first they's gonna think about somebody is going to be violating them and going up their rectum.	Man from USA	Pitts et al., 2013, p. 84

Table 2. Sample characteristics (N = 327)

Demographic variable		Descriptive statistics M (SD), Range
Age		61.9 (5.8), 51-75
Length of relationship with PCP (in months)		48.5 (46.57), 0-199
		% (n)
Race	White	73 (238)
	Black or African-American	21 (68)
	Asian-American/Pacific Islander	<1 (2)
	Native American	2 (7)
	Hispanic/Latino	<1 (1)
	Other/More than one race	3 (11)
Education		
	HS diploma/GED or less	36 (119)
	Some college or greater	64 (208)
Employment status		
	Unemployed/Retired	69 (226)
	Employed	31 (101)
Income		
	$30,999 or less	59 (194)
	$31,000 or greater	41 (133)
Marital status		
	Single, separated, divorced	40 (131)
	Married	55 (179)
	Widowed	5 (17)
Health insurance status		
	Yes	41 (135)
	No	59 (192)
Gender of PCP		
	Male	41.3 (135)
	Female	50.2 (164)
	Missing	8.6 (28)
Physician recommendation for CRC screening		
	Yes	91 (297)
	No	9 (30)
Family/friend recommendation for CRC screening		
	Yes	55 (181)
	No	45 (146)

Note: HS = high school; GED = General Education Development; PCP = primary care provider; CRC = colorectal cancer

Table 3. Intercorrelations among study variables

	% (n) or Mean (SD), *Range*	1	2	3	4	5	6	7	8	9	10	11
1. CRC screening status[1]	65 (213)	-										
2. Age	61.9 (5.82), *51-75*	**.230****	-									
3. Education level[2]	64 (208)	**.127***	.063	-								
4. Race[3]	73 (238)	.101	**.126***	.023	-							
5. Heterosexual self-presentation	1.79 (0.64), *0-3.0*	.003	-.025	**-.168****	**-.129***	-						
6. Self-reliance	1.24 (0.47), *0-2.4*	-.087	-.070	-.040	.101	.087	-					

Table 3, continued.

	% (n) or Mean (SD), *Range*	1	2	3	4	5	6	7	8	9	10	11
7. Risk-taking	1.10 (0.45), *0-3.0*	.013	-.005	**.135***	**.147****	**-.135***	**.129***	-				
8. Trust in PCP	4.13 (0.91), *1.2-5.0*	-.008	-.014	.008	-.037	.011	**-.159****	-.093	-			
9. Cancer fear	2.76 (0.92), *1.0-5.0*	-.052	-.046	**-.111***	.010	.069	**.135***	-.044	-.101	-		
10. Physician recommend.[4]	91 (297)	**.346****	.070	.090	.067	-.069	-.035	-.052	-.072	.015	-	
11. Family/friend recommend.[5]	55 (181)	**.117***	-.011	.062	-.107	-.058	-.020	-.007	**-.154****	**.130***	**.119***	-

Note. $N = 327$; $^{**}p < 0.01$ and $^{*}p < 0.05$.

Significant results are displayed in bold.

SD = standard deviation; CRC = colorectal cancer; PCP = primary care provider

Table 3, continued.

[1]C RC screening status coded as 0 = no and 1 = yes.

[2]Education level coded as 0 = HS diploma or GED or less and 1 = some college or more.

[3]Race coded as 0 = minority race and 1 = White race.

[4]Physician recommendation for CRC screening coded as 0 = no and 1 = yes.

[5]Family/friend recommendation for CRC screening coded as 0 = no and 1 = yes.

Table 4. Logistic regression analyses predicting colorectal cancer screening adherence as a function of masculinity norms (Aim 1)

	Variables	B	SE	Wald chi-square (*df*=1)	Odds ratio	95% CI for odds ratio
Heterosexual self-presentation model						
Block 1	Race[1]	-0.342	0.265	1.670	0.710	0.422-1.194
	Age	**0.083****	0.022	14.668	1.086	1.041-1.133
	Education level[2]	**-0.518***	0.246	4.451	0.595	0.368-0.964
	Constant	**-4.155***	1.334	9.703	0.016	
Block 2	Race[1]	-0.366	0.268	1.867	0.694	0.410-1.172
	Age	**0.083****	0.022	14.668	1.086	1.041-1.133
	Education level[2]	**-0.547***	0.250	4.800	0.579	0.355-0.944
	Heterosexual self-presentation	0.132	0.193	0.470	1.141	0.782-1.666
	Constant	**-4.382****	1.378	10.107	0.012	
Self-reliance model						
Block 1	Race[1]	-0.342	0.265	1.670	0.710	0.422-1.194
	Age	**0.083****	0.022	14.668	1.086	1.041-1.133
	Education level[2]	**-0.518***	0.246	4.451	0.595	0.368-0.964
	Constant	**-4.155***	1.334	9.703	0.016	
Block 2	Race[1]	-0.394	0.268	2.159	0.674	0.399-1.141
	Age	**0.081****	0.022	13.990	1.085	1.039-1.132
	Education level[2]	**-0.511***	0.246	4.294	0.600	0.370-0.973
	Self-reliance	-0.383	0.262	2.135	0.682	0.408-1.140
	Constant	**-3.572***	1.394	6.566	0.028	

Table 4, continued.

	Variables	B	SE	Wald chi-square (*df*=1)	Odds ratio	95% CI for odds ratio
Risk-taking model						
Block 1	Race[1]	-0.342	0.265	1.670	0.710	0.422-1.194
	Age	**0.083****	0.022	14.668	1.086	1.041-1.133
	Education level[2]	**-0.518***	0.246	4.451	0.595	0.368-0.964
	Constant	**-4.155***	1.334	9.703	0.016	
Block 2	Race[1]	-0.351	0.268	1.715	0.704	0.416-1.190
	Age	**0.082****	0.022	14.612	1.086	1.041-1.133
	Education level[2]	**-0.525***	0.248	4.494	0.591	0.364-0.961
	Risk-taking	-0.061	0.276	0.049	0.941	0.548-1.616
	Constant	**-4.075***	1.381	8.701	0.017	

Note: $N = 327$; *$p < .05$, **$p < .01$.

The outcome variable, colorectal cancer screening adherence, was coded as 0 = no and 1 = yes.

Significant results are displayed in bold.

[1]Race coded as 0 = minority race and 1 = White race.

[2]Education level coded as 0 = HS diploma or GED or less and 1 = some college or more.

CI = confidence interval; SE = standard error

Table 5. Mediated model paths predicting CRC screening adherence (Aim 2)

Independent variable/Mediator of its effect on CRC screening adherence	Path a B (SE)	Path b B (SE)	Path c B (SE)	Path c' B (SE)	Indirect effect B (SE)	95% CI for the indirect effect
Risk-taking/Cancer fear	-0.0698 (0.1172)	-0.0762 (0.1304)	-0.0608 (0.2761)	-0.0655 (0.2764)	0.0053 (0.0199)	-0.0202-0.0904
Self-reliance/Trust in PCP	**-0.3104 (0.1086)****	-0.0292 (0.1353)	-0.3834 (0.2624)	-0.3919 (0.2655)	0.0091 (0.0480)	-0.0791-0.1205

Note: $N = 327$; **$p < .01$.

The outcome variable, CRC screening adherence, was coded as 0 = no and 1 = yes.

Significant results are displayed in bold.

Beta coefficients are unstandardized.

CRC = colorectal cancer; PCP = primary care provider; CI = confidence interval; SE = standard error

Path a is the relationship between the independent variable and the mediator.

Path b is the relationship between the mediator and the dependent variable.

Path c is the total effect of the independent variable on the dependent variable.

Path c' is the direct effect of the independent variable on the dependent variable.

Table 6. Cancer fear as mediator of the relationship between risk-taking and colorectal cancer screening adherence (Aim #2, Hypothesis #2.1)

Outcome: Cancer fear					
Variable	Coefficient	SE	*t*	p-value	95% CI
Constant	3.3545	0.5615	5.9740	***<0.01***	2.2498-4.4593
Risk-taking	-0.0698	0.1172	-0.5960	*0.5516*	-0.3004-0.1607
Age	-0.0068	0.0089	-0.7628	*0.4461*	-0.0242-0.0107
Race[1]	0.0462	0.1170	0.3952	*0.6930*	-0.1839-0.2763
Education level[2]	-0.2007	0.1073	-1.8698	*0.0624*	-0.4119-0.0105
Outcome: CRC screening adherence					
Variable	Coefficient	SE	*z*	p-value	95% CI
Constant	-4.7038	1.4227	-3.3063	***0.0009***	-7.4922--1.9154
Cancer fear	-0.0762	0.1304	-0.5843	*0.5590*	-0.3317-0.1794
Risk-taking	-0.0655	0.2764	-0.2369	*0.8128*	-0.6071-0.4762
Age	0.0821	0.0216	3.7994	***0.0001***	0.0397-0.1244
Race[1]	0.3540	0.2683	1.3194	*0.1870*	-0.1719-0.8799
Education level[2]	0.5112	0.2491	2.0526	***0.0401***	0.0231-0.9994
Outcome: CRC screening adherence *Total effect model*					
Variable	Coefficient	SE	*z*	p-value	95% CI
Constant	-4.9512	1.3590	-3.6433	***0.0003***	-7.6148--2.2877
Risk-taking	-0.0608	0.2761	-0.2204	*0.8256*	-0.6019-0.4802
Age	0.0825	0.0216	3.8225	***0.0001***	0.0402-0.1247
Race[1]	0.3509	0.2679	1.3098	*0.1903*	-0.1742-0.8760
Education level[2]	0.5254	0.2478	2.1199	***0.0340***	0.0396-1.0111
	Effect	SE	*z*	p-value	95% CI
Total effect of X on Y	-0.0608	0.2761	-0.2204	*0.8256*	-0.6019-0.4802
Direct effect of X on Y	-0.0655	0.2764	-0.2369	*0.8128*	-0.6071-0.4762
Indirect effect of X on Y	0.0053	0.0199	0.2674	*0.7892*	

Note: *N* = 327

The outcome variable, CRC screening adherence, was coded as 0 = no and 1 = yes.

Significant results are displayed in bold.

Coefficients are unstandardized.

SE = standard error; CI = confidence interval; CRC = colorectal cancer.

Table 6, continued.

[1]Race coded as 0 = minority race and 1 = White race.

[2]Education level coded as 0 = HS diploma or GED or less and 1 = some college or more.

Table 7. Trust in PCP as mediator of relationship between self-reliance and colorectal cancer screening adherence (Aim #2, Hypothesis #2.2)

Outcome: Trust in PCP					
Variable	Coefficient	SE	*t*	p-value	95% CI
Constant	4.7655	0.5644	8.4433	***<0.01***	3.6551-5.8759
Self-reliance	-0.3104	0.1086	-2.8573	***0.0046***	-0.5241--0.0967
Age	-0.0036	0.0087	-0.4138	*0.6793*	-0.0208-0.0136
Race[1]	-0.0372	0.1143	-0.3254	*0.7451*	-0.2620-0.1876
Education level[2]	0.0064	0.1045	0.0617	*0.9509*	-0.1991-0.2120
Outcome: CRC screening adherence					
Variable	Coefficient	SE	*z*	p-value	95% CI
Constant	-4.3325	1.5311	-2.8297	***0.0047***	-7.3334--1.3317
Trust in PCP	-0.0292	0.1353	-0.2160	*0.8290*	-0.2943-0.2359
Self-reliance	-0.3919	0.2655	-1.4762	*0.1399*	-0.9123-0.1284
Age	0.0810	0.0217	3.7295	***0.0002***	0.0384-0.1235
Race[1]	0.3936	0.2681	1.4680	*0.1421*	-0.1319-0.9190
Education level[2]	0.5103	0.2465	2.0706	***0.0384***	0.0273-0.9933
Outcome: CRC screening adherence *Total effect model*					
Variable	Coefficient	SE	*z*	p-value	95% CI
Constant	-4.4760	1.3809	-3.2414	***0.0012***	-7.1826--1.7695
Self-reliance	-0.3834	0.2624	-1.4613	*0.1439*	-0.8976-0.1308
Age	0.0811	0.0217	3.7404	***0.0002***	0.0386-0.1237
Race[1]	0.3939	0.2681	1.4692	*0.1418*	-0.1316-0.9193
Education level[2]	0.5106	0.2464	2.0722	***0.0382***	0.0277-0.9936
	Effect	SE	*z*	p-value	95% CI
Total effect of X on Y	-0.3834	0.2624	-1.4613	*0.1439*	-0.8976-0.1308
Direct effect of X on Y	-0.3919	0.2655	-1.4762	*0.1399*	-0.9123-0.1284
Indirect effect of X on Y	0.0091	0.0446	0.2043	*0.8388*	

Note: $N = 327$

The outcome variable, CRC screening adherence, was coded as 0 = no and 1 = yes.

Significant results are displayed in bold.

Coefficients are unstandardized.

SE = standard error; PCP = primary care provider; CI = confidence interval; CRC = colorectal cancer

Table 7, continued.

[1]Race coded as 0 = minority race and 1 = White race.

[2]Education level coded as 0 = HS diploma or GED or less and 1 = some college or more.

Table 8. Moderated mediation model paths predicting CRC screening adherence (Aim 3)

Independent variable/ Mediator/ Moderator	Path a B (SE)	Path b B (SE)	Path c' B (SE)	95% CI for Path c'	Interaction B (SE)	95% CI for interaction	Moderated mediation index B (SE)	95% CI for moderated mediation index
Risk-taking/ Cancer fear/ Age	-0.0670 (0.1170)	2.120 (1.463)	-0.0881 (0.2767)	-0.6304-0.4543	-0.0360 (0.0239)	-0.0828-0.0108	0.0024 (0.0061)	-0.0050-0.0232
Self-reliance/ Trust in PCP/ Race	**-0.3143** (0.1078)**	-0.0961 (0.2811)	-0.4202 (0.2677)	-0.9450-0.1045	0.0766 (0.3189)	-0.5484-0.7017	-0.0241 (0.1268)	-0.3176-0.2058
Self-reliance/ Trust in PCP/ Length of relationship with PCP	**-0.3104** (0.1078)**	-0.1131 (0.1939)	-0.3751 (0.2657)	-0.8959-0.1456	0.0017 (0.0034)	-0.0051-0.0084	-0.0005 (0.0013)	-0.0036-0.0018

Note: $N = 327$; $^{**}p < .01$.

The outcome variable, CRC screening adherence, was coded as 0 = no and 1 = yes.

Race coded as 0 = African American race and 1 = White race.

Significant results are displayed in bold.

Beta coefficients are unstandardized.

CI = confidence interval; SE = standard error; PCP = primary care provider; CRC = colorectal cancer

Table 8, continued.

Path a is the relationship between the independent variable and the mediator.

Path b is the relationship between the mediator and the dependent variable.

Path c’ is the direct effect of the independent variable on the dependent variable.

Table 9. Moderated mediation of relationship between risk-taking and colorectal cancer screening adherence (Aim #3, Hypothesis #3.1)

Outcome: Cancer fear					
Variable	Coefficient	SE	*t*	*p*-value	95% CI
Constant	2.9439	0.1596	18.4459	***<0.01***	2.6299-3.2579
Risk-taking	-0.0670	0.1170	-0.5722	*0.5676*	-0.2972-0.1633
Race[1]	0.0348	0.1159	0.3000	*0.7644*	-0.1933-0.2628
Education level[2]	-0.2060	0.1070	-1.9243	*0.0552*	-0.4166-0.0046
Outcome: CRC screening adherence					
Variable	Coefficient	SE	*z*	*p*-value	95% CI
Constant	-10.9344	4.4145	-2.4769	***0.0133***	-19.5868--2.2821
Cancer fear	2.1204	1.4631	1.4493	*0.1473*	-0.7472-4.9880
Risk-taking	-0.0881	0.2767	-0.3183	*0.7503*	-0.6304-0.4543
Age	0.1841	0.0718	2.5633	***0.0104***	0.0433-0.3248
Interaction (Cancer fear x Age)	-0.0360	0.0239	-1.5074	*0.1317*	-0.0828-0.0108
Race[1]	0.3982	0.2706	1.4716	*0.1411*	-0.1321-0.9285
Education level[2]	0.5097	0.2495	2.0433	***0.0410***	0.0208-0.9987
Direct and indirect effects					
	Effect	SE	*z*	*p*-value	95% CI
Direct effect of X on Y	-0.0881	0.2767	-0.3183	*0.7503*	-0.6304-0.4543
Conditional indirect effect of X on Y at values of the moderator					
Mediator	Age	Effect	Boot SE	95% CI	
Cancer fear	53	-0.0143	0.0460	-0.1962-0.0343	
Cancer fear	57	-0.0046	0.0267	-0.1065-0.0248	
Cancer fear	62	0.0074	0.0252	-0.0204-0.0998	
Cancer fear	66	0.0171	0.0437	-0.0353-0.1641	
Cancer fear	69	0.0243	0.0605	-0.0509-0.2202	
Index of moderated mediation					
Mediator	Index	Boot SE	Boot 95% CI		
Cancer fear	0.0024	0.0061	-0.0050-0.0232		

Note: $N = 327$.

The outcome variable, CRC screening adherence, was coded as 0 = no and 1 = yes.

Significant results are displayed in bold.

Coefficients are unstandardized.

SE = standard error; CI = confidence interval; CRC = colorectal cancer

[1]Race coded as 0 = minority race and 1 = White race.

[2]Education level coded as 0 = HS diploma or GED or less and 1 = some college or more.

Table 10. Moderated mediation of relationship between self-reliance and colorectal cancer screening adherence with race as moderator (Aim #3, Hypothesis #3.2)

Outcome: Trust in PCP					
Variable	Coefficient	SE	*t*	*p*-value	95% CI
Constant	4.7672	0.5636	8.4583	***<0.01***	3.6584-5.8760
Self-reliance	-0.3143	0.1078	-2.9161	***0.0038***	-0.5264--0.1023
Age	-0.0040	0.0087	-0.4618	*0.6445*	-0.0210-0.0130
Education level[1]	0.0058	0.1043	0.0555	*0.9558*	-0.1994-0.2110
Outcome: CRC screening adherence					
Variable	Coefficient	SE	*z*	*p*-value	95% CI
Constant	-4.2163	1.7993	-2.3433	***0.0191***	-7.7430--0.6897
Trust in PCP	-0.0961	0.2811	-0.3418	*0.7325*	-0.6469-0.4548
Self-reliance	-0.4202	0.2677	-1.5696	*0.1165*	-0.9450-0.1045
Race[2]	0.1388	1.3451	0.1032	*0.9178*	-2.4976-2.7752
Interaction (Trust in PCP x Race)	0.0766	0.3189	0.2403	*0.8101*	-0.5484-0.7017
Age	0.0831	0.0217	3.8342	***0.0001***	0.0406-0.1256
Education level[1]	0.5072	0.2467	2.0559	***0.0398***	0.0237-0.9907
Direct and indirect effects					
	Effect	SE	*z*	*p*-value	95% CI
Direct effect of X on Y	-0.4202	0.2677	-1.5696	*0.1165*	-0.9450-0.1045
Conditional indirect effect of X on Y at values of the moderator					
Mediator	Race	Effect	Boot SE	95% CI	
Trust in PCP	Black	0.0302	0.1154	-0.1577-0.3146	
Trust in PCP	White	0.0061	0.0538	-0.0941-0.1267	
Index of moderated mediation					
Mediator	Index	Boot SE	Boot 95% CI		
Trust in PCP	-0.0241	0.1268	-0.3176-0.2058		

Note: $N = 327$.

The outcome variable, CRC screening adherence, was coded as 0 = no and 1 = yes.

Significant results are displayed in bold.

Coefficients are unstandardized.

PCP = primary care provider; SE = standard error; CI = confidence interval; CRC = colorectal cancer

[1]Education level coded as 0 = HS diploma or GED or less and 1 = some college or more.

[2]Race coded as 0 = African American or Black race and 1 = White race

Table 11. Moderated mediation of relationship between self-reliance and colorectal cancer screening adherence with length in patient-provider relationship as moderator (Aim #3, Hypothesis #3.3)

Outcome: Trust in PCP					
Variable	Coefficient	SE	*t*	*p*-value	95% CI
Constant	4.7655	0.5644	8.4433	***<0.01***	3.6551-5.8759
Self-reliance	-0.3104	0.1086	-2.8573	***0.0046***	-0.5241--0.0967
Age	-0.0036	0.0087	-0.4138	*0.6793*	-0.0208-0.0136
Race[1]	-0.0372	0.1143	-0.3254	*0.7451*	-0.2620-0.1876
Education level[2]	0.0064	0.1045	0.0617	*0.9509*	-0.1991-0.2120
Outcome: CRC screening adherence					
Variable	Coefficient	SE	*z*	*p*-value	95% CI
Constant	-3.9840	1.6426	-2.4254	***0.0153***	-7.2034--0.7646
Trust in PCP	-0.1131	0.1939	-0.5834	*0.5597*	-0.4932-0.2670
Self-reliance	-0.3751	0.2657	-1.4119	*0.1580*	-0.8959-0.1456
Length of relation.	-0.0049	0.0151	-0.3250	*0.7452*	-0.0345-0.0247
Interaction (Trust in PCP x Length)	0.0017	0.0034	0.4839	*0.6285*	-0.0051-0.0084
Age	0.0787	0.0218	3.6044	***0.0003***	0.0359-0.1214
Race[1]	0.4269	0.2706	1.5776	*0.1146*	-0.1035-0.9573
Education level[2]	0.4943	0.2473	1.9985	***0.0457***	0.0095-0.9791
Direct and indirect effects					
	Effect	SE	*z*	*p*-value	95% CI
Direct effect of X on Y	-0.3751	0.2657	-1.4119	*0.1580*	-0.8959-0.1456
Conditional indirect effect of X on Y at values of the moderator					
Mediator	Length	Effect	Boot SE	95% CI	
Trust in PCP	0	0.0351	0.0723	-0.0830-0.2189	
Trust in PCP	10.51	0.0297	0.0627	-0.0735-0.1891	
Trust in PCP	31.18	0.0190	0.0500	-0.0704-0.1381	
Trust in PCP	78.92	-0.0057	0.0693	-0.1529-0.1366	
Trust in PCP	118.14	-0.0260	0.1122	-0.2823-0.1883	
Index of moderated mediation					
Mediator	Index	Boot SE	Boot 95% CI		
Trust in PCP	-0.0005	0.0013	-0.0036-0.0018		

Note: $N = 327$

The outcome variable, CRC screening adherence, was coded as 0 = no and 1 = yes.

Significant results are displayed in bold.

Coefficients are unstandardized.

PCP = primary care provider; SE = standard error; CI = confidence interval; Length = length of patient-provider relationship; CRC = colorectal cancer

Table 11, continued.

[1]Race coded as 0 = African American or Black race and 1 = White race.

[2]Education level coded as 0 = HS diploma or GED or less and 1 = some college or more.

Table 12. Logistic regression analyses predicting colorectal cancer screening adherence as a function of masculinity norms (Aim 4)

	Variables	B	SE	Wald chi-square (*df*=1)	Odds ratio	95% CI for odds ratio
Block 1	Race[1]	-0.329	.286	1.327	0.719	0.411-1.260
	Age	**0.085****	.023	13.633	1.088	1.041-1.139
	Education level[2]	-0.413	.263	2.470	0.662	0.396-1.107
	Physician recommend.[3]	**-2.640****	.570	21.416	0.071	0.023-0.218
	Family/friend recommend.[4]	-0.403	.260	2.393	0.668	0.401-1.113
	Constant	**-3.919****	1.426	7.553	0.020	
Block 2	Race[1]	-0.411	.294	1.946	0.663	0.372-1.181
	Age	**0.084****	.023	13.034	1.087	1.039-1.138
	Education level[2]	-0.436	.269	2.620	0.647	0.382-1.096
	Physician recommend.[3]	**-2.677****	.574	21.712	0.069	0.022-0.212
	Family/friend recommend.[4]	-0.417	.262	2.524	0.659	0.394-1.102
	Heterosexual self-present.	0.258	.207	1.548	1.294	0.862-1.943
	Self-reliance	-0.411	.280	2.154	0.663	0.383-1.148
	Risk-taking	0.176	.300	0.344	1.192	0.663-2.144
	Constant	**-3.938***	1.574	6.262	0.019	

Note: $N = 327$; *$p < .05$. **$p < .01$.

The outcome variable, CRC screening adherence, was coded as 0 = no and 1 = yes.

Significant results are displayed in bold.

Beta coefficients are unstandardized.

Table 12, continued.

SE = standard error; CI = confidence interval; CRC = colorectal cancer

[1]Race coded as 0 = minority race and 1 = White race.

[2]Education level coded as 0 = HS diploma or GED or less and 1 = some college or more.

[3]Physician recommendation coded as 0 = no and 1 = yes.

[4]Family/friend recommendation coded as 0 = no and 1 = yes.

Table 13. Multinomial logistic regression analyses predicting receipt of colonoscopy and stool blood testing (Aim 5)

Independent variable	B	SE	Wald (*df*=1)	Odds ratio	95% CI for odds ratio
Outcome: Receipt of colonoscopy					
Intercept	**-4.891****	1.487	10.815		
Age	**0.082****	0.022	13.898	1.086	1.040-1.134
Race[1]	0.405	0.277	2.130	1.499	0.871-2.580
Education level[2]	**0.565***	0.256	4.851	1.759	1.064-2.908
Heterosexual self presentation	0.179	0.199	0.808	1.196	0.810-1.767
Self-reliance	-0.440	0.272	2.623	0.644	0.378-1.097
Risk-taking	-0.030	0.287	0.011	0.971	0.553-1.703
Outcome: Receipt of stool blood testing					
Intercept	**-7.584***	3.363	5.085		
Age	0.071	0.048	2.186	1.073	0.977-1.178
Race[1]	0.673	0.686	0.962	1.960	0.511-7.521
Education level[2]	0.305	0.562	0.294	1.357	0.451-4.084
Heterosexual self-presentation	0.010	0.434	0.001	1.010	0.431-2.367
Self-reliance	-0.037	0.591	0.004	0.963	0.302-3.070
Risk-taking	0.598	0.615	0.948	1.819	0.545-6.069

Note: $N = 327$; *$p < .05$, **$p < .01$.

Receipt of colonoscopy and stool blood testing were each coded as 0 = no and 1 = yes.

Significant results are displayed in bold.

Beta coefficients are unstandardized.

SE = standard error; CI = confidence interval

Table 13, continued.

[1]Race coded as 0 = minority race and 1 = White race.

[2]Education level coded as 0 = HS diploma or GED or less and 1 = some college or more.

Table 14. Logistic regression analysis predicting endoscopic CRC screening as a function of masculinity norms (modified Aim 5)

	Variables	B	SE	Wald chi-square (*df*=1)	Odds ratio	95% CI for odds ratio
Block 1	Age	**0.086****	0.022	15.159	1.090	1.044-1.139
	Race[1]	-0.306	0.270	1.291	0.736	0.434-1.249
	Education level[2]	**-0.550***	0.251	4.819	0.577	0.353-0.943
	Constant	**-4.469****	1.371	10.623	0.011	
Block 2	Age	**0.086****	0.022	14.540	1.089	1.042-1.138
	Race[1]	-0.402	0.279	2.071	0.669	0.387-1.156
	Education level[2]	**-0.580***	0.257	5.103	0.560	0.339-0.926
	Heterosexual self-presentation	0.162	0.199	0.668	1.176	0.797-1.736
	Self-reliance	-0.476	0.275	2.987	0.621	0.362-1.066
	Risk-taking	-0.005	0.284	0.000	0.995	0.570-1.737
	Constant	**-4.069****	1.506	7.300	0.017	

Note: $N = 310$. *$p < .05$. **$p < .01$.

Endoscopic CRC screening coded as 0 = no and 1 = yes.

Significant results are displayed in bold.

Coefficients are unstandardized.

SE = standard error; CI = confidence interval; CRC = colorectal cancer

[1]Race coded as 0 = minority race and 1 = White race.

[2]Education level coded as 0 = HS diploma or GED or less and 1 = some college or more.

FIGURES

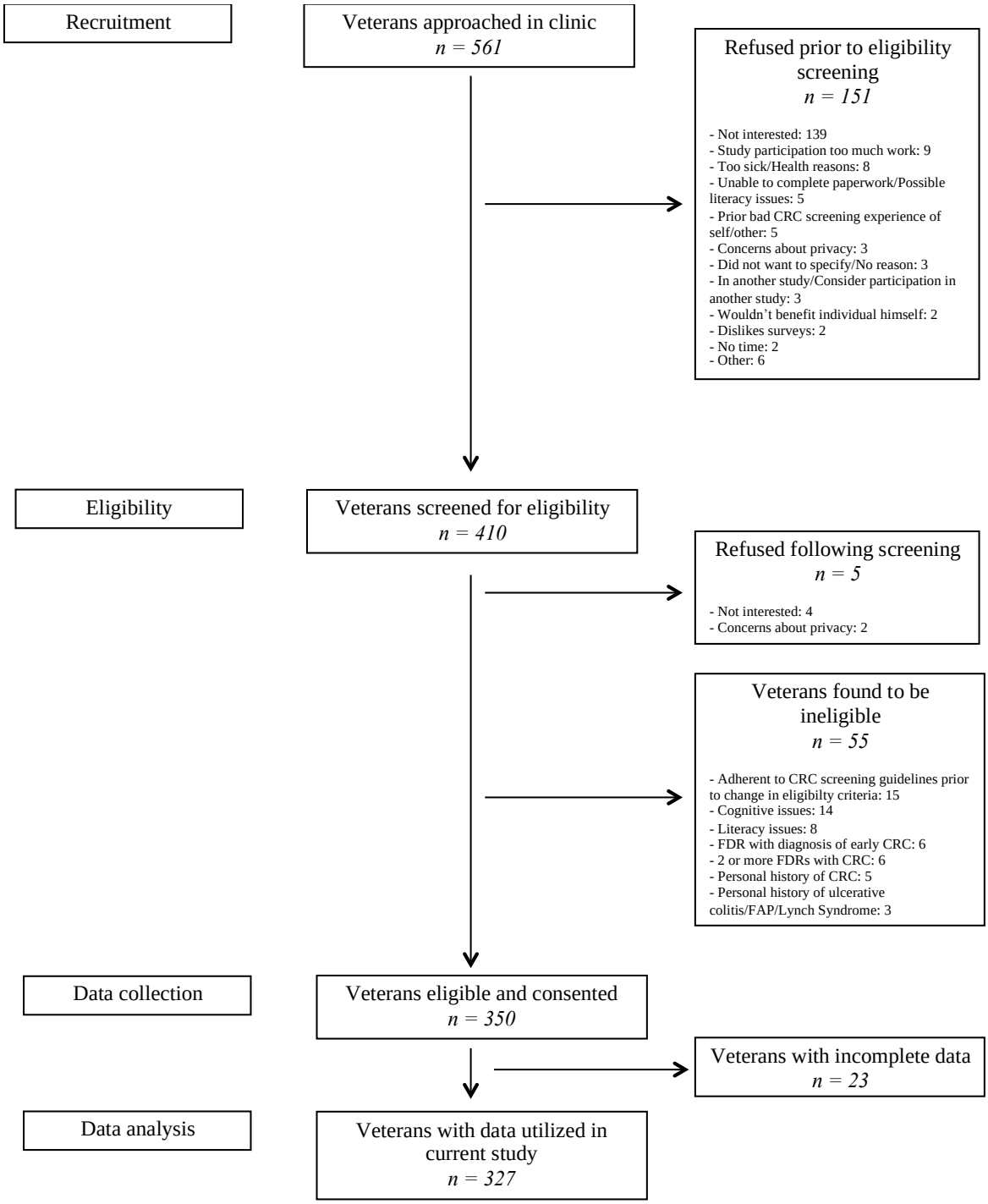

Figure 1. Study flowchart

Figure 1, continued.

Note: CRC = colorectal cancer; FDR = first degree relative; FAP = familial adenomatous polyposis

Change in eligibility criteria during the course of the study: Originally, according to eligibility criteria, only 150 individuals from each group (i.e., adherent and non-adherent to CRC screening) were to be consented. However, due to low numbers of non-adherent veterans, eligibility criteria were altered such that this criterion was omitted.

Veterans could indicate more than one reason for refusal and, thus, reason for refusal totals do not equal the number of the individuals who refused to participate.

Aim #1
Hypothesis #1.1

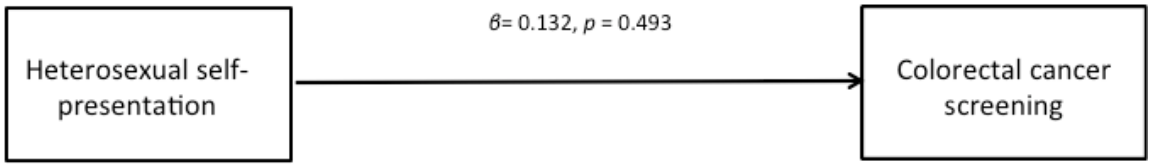

Figure 2. Heterosexual self-presentation model

Note: Colorectal cancer screening status coded as 0 = no and 1 = yes.

Aim #1
Hypothesis #1.1

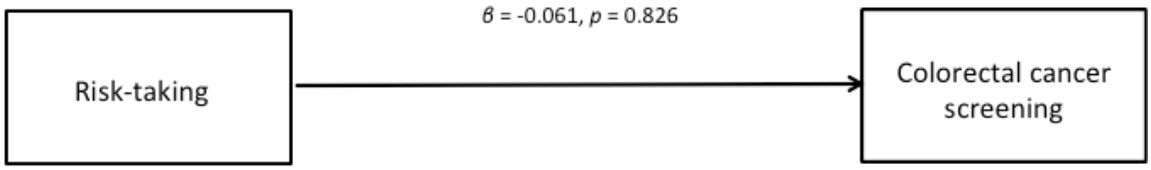

Figure 3. Risk-taking model

Note: Colorectal cancer screening status coded as 0 = no and 1 = yes.

Aim #1
Hypothesis #1.1

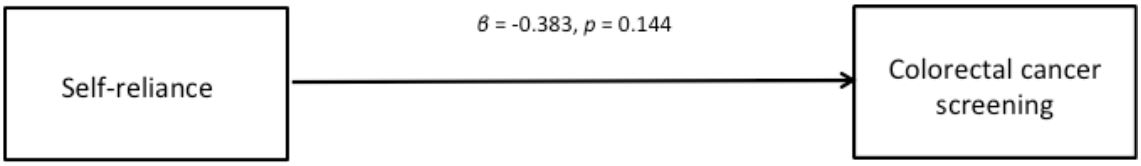

Figure 4. Self-reliance model

Note: Colorectal cancer screening status coded as 0 = no and 1 = yes.

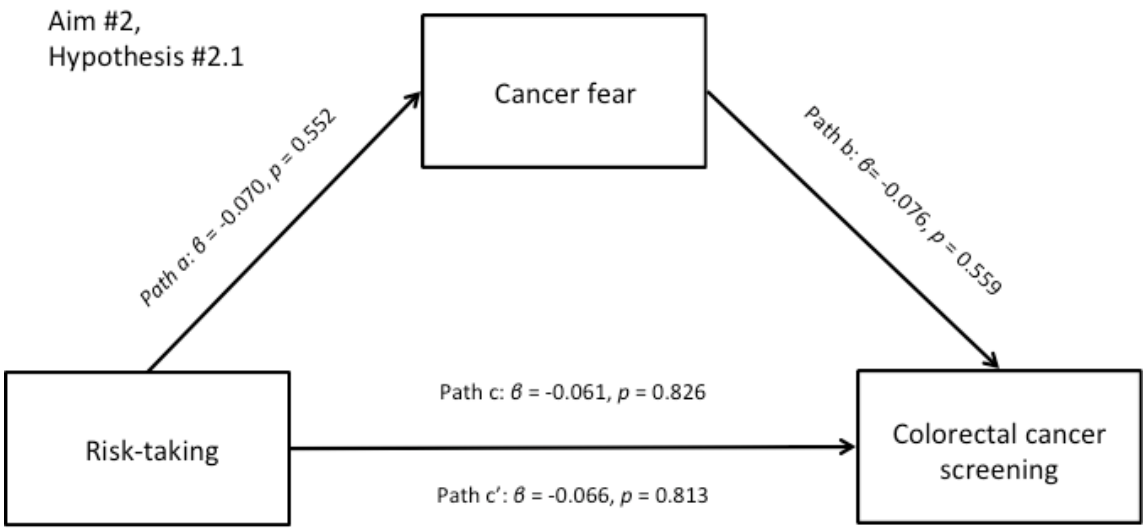

Figure 5. Risk-taking mediation model

Note: Colorectal cancer screening status coded as 0 = no and 1 = yes.

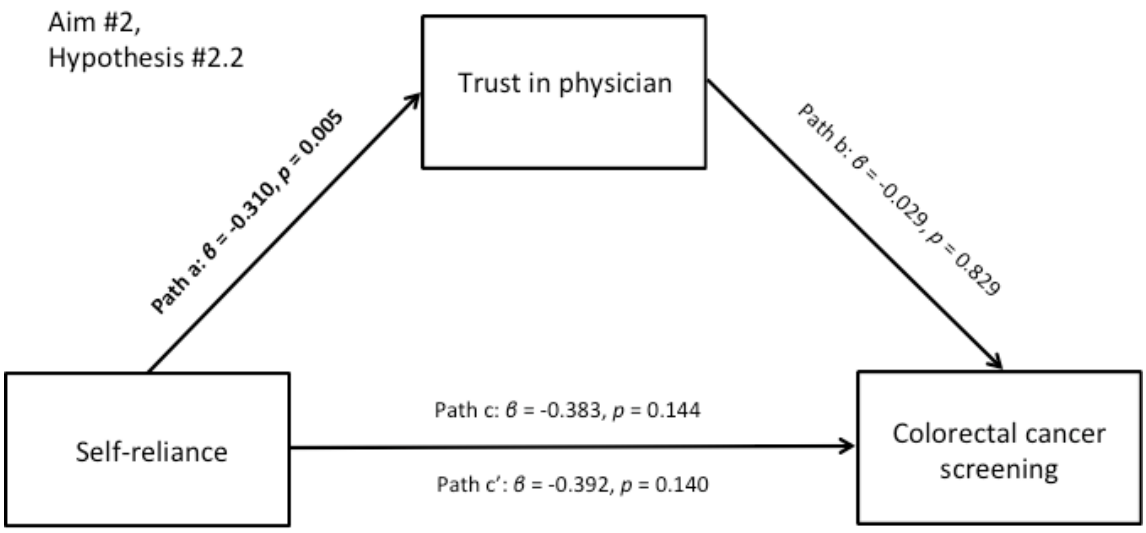

Figure 6. Self-reliance mediation model

Note: Colorectal cancer screening status coded as 0 = no and 1 = yes.

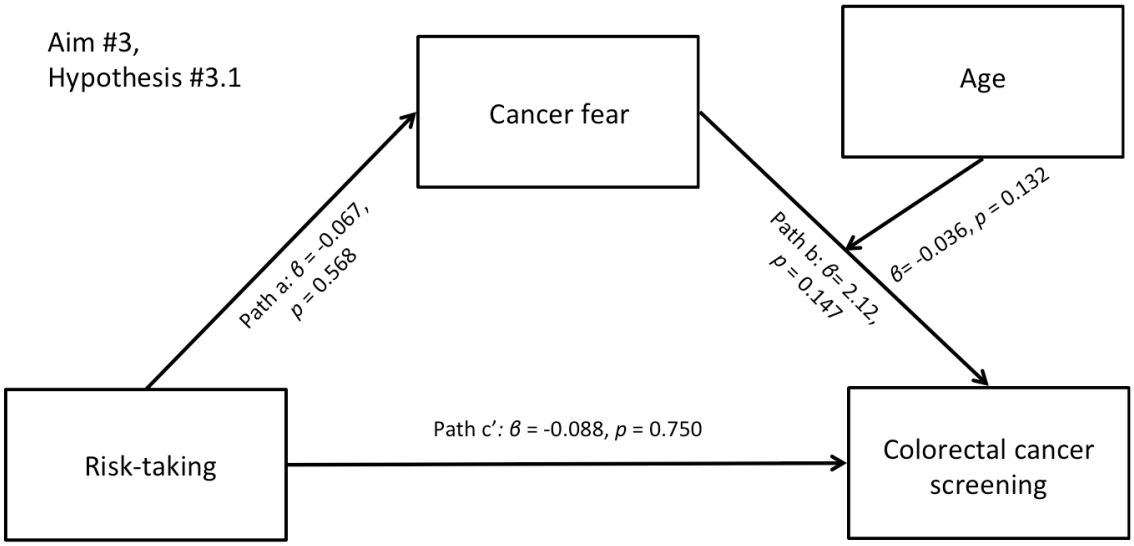

Figure 7. Risk-taking moderated mediation model

Note: Colorectal cancer screening status coded as 0 = no and 1 = yes.

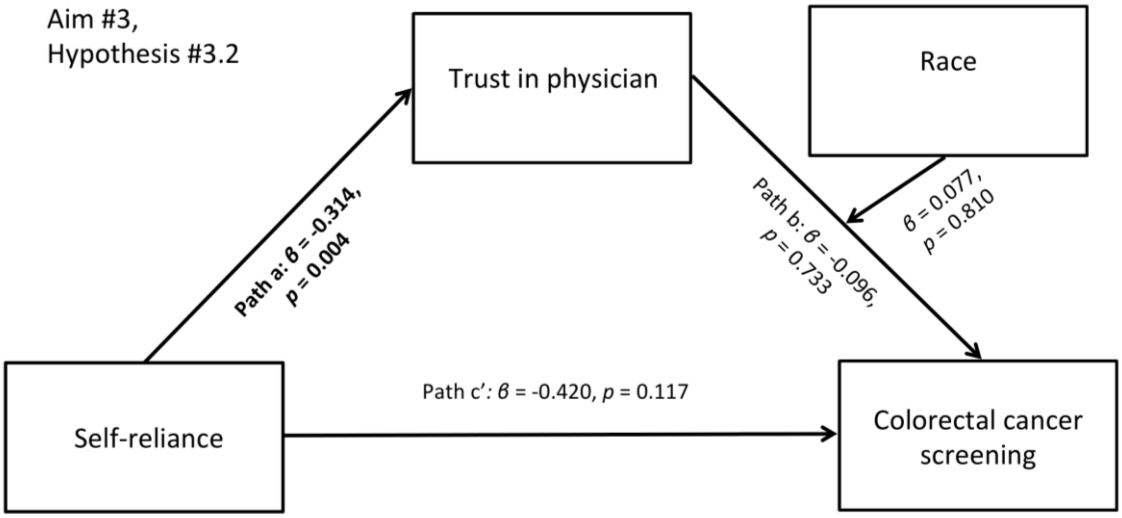

Figure 8. Self-reliance moderated mediation model #1

Note: Colorectal cancer screening status coded as 0 = no and 1 = yes. Race coded as 0 = minority race and 1 = White race. Significant results are displayed in bold.

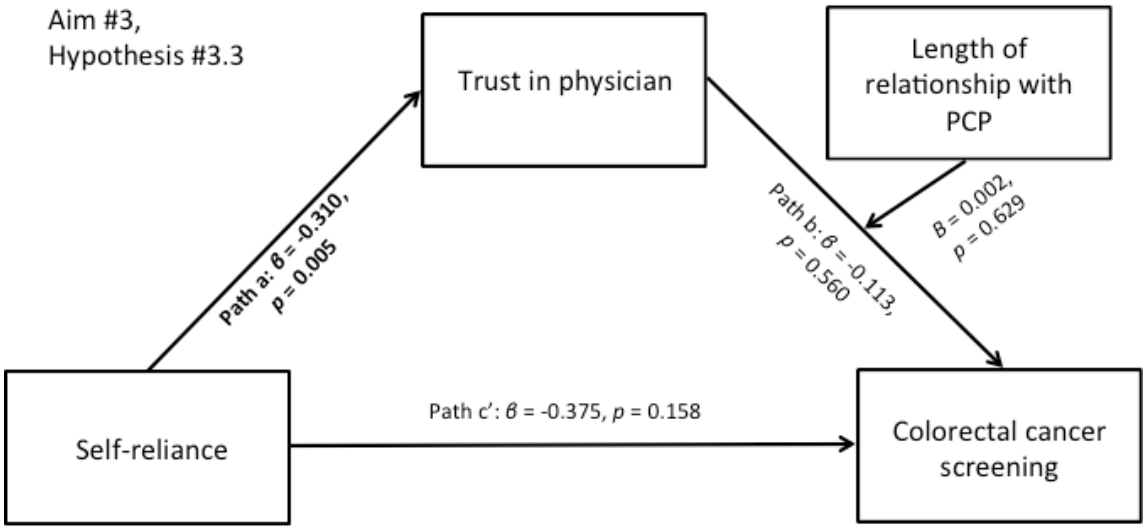

Figure 9. Self-reliance moderated mediation model #2

Note: Colorectal cancer screening status coded as 0 = no and 1 = yes. PCP = primary care provider. Significant results are displayed in bold.

APPENDICES

Appendix A: Health Questions

1. Has a doctor ever told you that you had colon or rectal cancer?

   Yes No

2. Have any of your close blood relatives ever had colon or rectal cancer? By close blood relatives, I mean your parents, brothers, sisters, or children.

   Yes No

3. If "yes" to question #2, how many of your close blood relatives (parents, sisters, brothers, or children) have had cancer of the colon or rectum?

   _____

4. If "yes" to question #2, did any of these relatives have cancer of the colon or rectum before they were 60 years old?

   Yes No

5. Have you ever been told you have ulcerative colitis or Crohn's disease?

   Yes No

6. Have you ever been told you have Lynch syndrome or familial adenomatous polyposis?

   Yes No

7. Has a doctor ever told you that you had colon or rectal polyps that were not cancer?

   Yes No

Now there are some questions about colorectal cancer testing.

The stool blood test, which is sometimes called a Hemoccult or fecal occult blood test or fecal immunochemical test, is something you do at home to examine your stool for hidden blood. The test requires you to place a small sample of your stool or bowel movement on a special card that comes in a kit. This card is then sent to your doctor's office or to a lab for testing.

8. Have you done a stool blood test at home and mailed or brought the cards back to your doctor's office or a lab in the past 12 months?

Yes No

During a sigmoidoscopy, a doctor inserts a thin, flexible tube with a light into your rectum to examine your colon for any unusual growths. The tube is shorter than the one used for a colonoscopy and does not allow the doctor to see as much of your colon. You rarely need medicine to help you relax for this test. The test usually takes about 15 minutes.

9. Have you had a sigmoidoscopy in the past 5 years?

Yes No

A colonoscopy is a test where a doctor inserts a thin, flexible tube with a light into your rectum to examine your colon for any unusual growths. Right before the test, you get some medicine to help you relax. The test usually takes 30 to 60 minutes, depending on whether there are growths or polyps that need to be removed. Afterward, you wait for the relaxing medicine to wear off, and someone has to drive you home.

10. Have you had a colonoscopy in the past 10 years?

Yes No

THANK YOU FOR YOUR PARTICIPATION!

Appendix B: Health Experiences

1. Have you ever been diagnosed with a cancer other than colon, rectal, or skin cancers?

   Yes No

2. Have any of your friends or co-workers had colon or rectal cancer?

   Yes No

3. Have any of your distant blood relatives had colon or rectal cancer? This would include your grandparents, aunts, uncles, or cousins.

   Yes No

4. Have any family members or friends encouraged you to have a colon test?

   Yes No

Now there are some questions about the stool blood test, which is sometimes called a Hemoccult or fecal occult blood test or fecal immunochemical test. This is something you do at home to examine your stool for hidden blood. The test requires you to place a small sample of your stool or bowel movement on a special card that comes in a kit. This card is then sent to your doctor's office or to a lab for testing.

5. Has a doctor ever recommended that you do a stool blood test?

   Yes No

6. Have you ever done a stool blood test at home and mailed or brought the cards back to your doctor's office or a lab? Yes No

7. If yes to question #6, when did you do your most recent stool blood test at home?

   Month: _____ Year: _____

8. If yes to question #6, did you send your most recent stool blood test to the VA?

   Yes No

During a sigmoidoscopy, a doctor inserts a thin, flexible tube with a light into your rectum to examine your colon for any unusual growths. The tube is shorter than the one used for a colonoscopy and does not allow the doctor to see as much of your colon. You rarely need medicine to help you relax for this test. The test usually takes about 15 minutes.

9. Has a doctor ever recommended you have a sigmoidoscopy? Yes No

10. Have you ever had a sigmoidoscopy? Yes No

11. If yes to question #10, when was your most recent sigmoidoscopy?

Month: _____ Year: _____

12. If yes to question #10, was your most recent sigmoidoscopy completed at the VA?

Yes No

A colonoscopy is a test where a doctor inserts a thin, flexible tube with a light into your rectum to examine your colon for any unusual growths. Right before the test, you get some medicine to help you relax. The test usually takes 30 to 60 minutes, depending on whether there are growths or polyps that need to be removed. Afterward, you wait for the relaxing medicine to wear off, and someone has to drive you home.

13. Has a doctor ever recommended you have a colonoscopy? Yes No

14. Have you ever had a colonoscopy? Yes No

15. If yes to question #14, when was your most recent colonoscopy?

Month: _____ Year: _____

16. If yes to question #14, was your most recent colonoscopy completed at the VA?

Yes No

Note: The instructions for the Trust in Physician measure and all 5 items of the Trust in Physician measure were located here in the study questionnaire.

Note: The instructions for the Conformity to Masculine Norms meaure and all 46 items of the Conformity to Masculine Norms Inventory were located here in the study questionnaire.

Note: The instructions for the Cancer Fear measure and all 8 items of the Cancer Fear measure were located here in the study questionnaire.

General Information

1. Age: _____ years

2. What race or ethnicity do you consider yourself to be? ___White ___Black or African American ___Asian-American or Pacific Islander ___Native American ___Hispanic or Latino ___Other (please specify)_____

3. Marital Status (check one) ___Single ___Living with partner ___Married ___Separated ___Divorced ___Widowed

4. Employment status (check one) ___Employed full-time

   ___Employed part-time ___Student ___Homemaker ___Retired

   ___Unemployed, looking for work ___Unemployed, due to disability

   ___Other (please specify) _____

5. What is the highest grade or year of school you completed?

   ___Never attended school or only attended kindergarten

   ___Grades 1 through 8 (Elementary)

   ___Grades 9 through 11 (Some high school)

   ___Grade 12 or GED (High school graduate)

   ___College 1 year to 3 years (Some college or technical school)

   ___ College 4 years or more (College graduate)

   ___Graduate school (Master's degree, Doctorate, etc.)

6. Do you have health insurance coverage now (outside of VA benefits)?

   Yes No

7. What is your combined yearly household income before taxes?

   ___ $0-$10,999 ___$11,000-$20,999 ___$21,000-$30,999

   ___$31,000-$50,999 ___$51,000 to $99,999 ___$100,000 or more

THANK YOU FOR YOUR PARTICIPATION!

VITA

VITA

Shannon M. Christy, Ph.D.
August 2015

EDUCATION

Doctor of Philosophy in Clinical Psychology, August 2010-August 2015
Department of Psychology
Indiana University-Purdue University Indianapolis, Indianapolis, Indiana
APA-Accredited Clinical Psychology PhD Program
Mentors: Catherine E. Mosher, PhD and Susan M. Rawl, PhD, RN, FAAN

Pre-doctoral Clinical Psychology Internship: VA Connecticut Healthcare System-West Haven (APA-Accredited)--Clinical Health Psychology Track
Dates: July 1, 2014-June 30, 2015

Dissertation: *Relationships between masculinity beliefs and colorectal cancer screening in male veterans*
Chairperson: Catherine E. Mosher, PhD
Committee: Susan M. Rawl, PhD, RN, FAAN, David Haggstrom, MD, MAS, and Kevin Rand, PhD
Defense date: April 10, 2015

Preliminary examination: *Masculinity, men's health, and colorectal cancer screening*
Chairperson: Catherine E. Mosher, PhD
Committee: Susan M. Rawl, PhD, RN, FAAN and Kevin L. Rand, PhD
Defense date: September 21, 2012

Master of Arts in Counseling, August 2007-July 2010
Department of Counseling Psychology
Ball State University, Muncie, Indiana

Thesis: *Quality of life differences among long-term cancer survivors based upon cancer type and number of treatments*
Chairperson: Donald Nicholas, PhD, HSPP
Committee: Lawrence H. Gerstein, PhD and Charlene M. Alexander, PhD

Bachelor of Arts, January 2001-May 2003
Miami University, Oxford, Ohio
Magna cum laude
Major: Psychology
Departmental Honors: Psychology

Wright State University, Dayton, Ohio, September 1999-December 2000

PROFESSIONAL INTERESTS

Research Interests:

- Cancer Preventive Health Beliefs and Behaviors
- Health Disparities
- Medical Decision-making
- Health Literacy
- Cancer Care across the Continuum

Clinical Interests:

- Health Psychology and Behavioral Medicine
- Adaptation to Physical Illness such as Cancer
- Psychosocial Contributors to Health and Illness Management
- Preventive Health Beliefs and Behaviors
- Health Disparities
- Stress and Coping

GRANTS AND FELLOWSHIPS

2013 Scott Mesh Honorary Grant for Research in Psychology, July 2013, American Psychological Association of Graduate Students

Clinical Psychology Program Research Grant, May 2013, IUPUI Department of Psychology

Clinical Psychology Program Travel Grant, April 2013, IUPUI Department of Psychology

Educational Enhancement Grant, February 2013, IUPUI Graduate and Professional Student Government

Indiana University Simon Cancer Center Cancer Prevention and Control Pilot Funding, March 2012-March 2014, *Barriers and Facilitators of Colonoscopy Completion after Referral.* Susan M. Rawl, PhD, RN, FAAN (PI). Role: Co-Investigator

National Cancer Institute R25 award. *Training in Research for Behavioral Oncology and Cancer Control.* R25-CA117865, July 2011-June 2014. Victoria L. Champion, PhD, RN, FAAN (PI). Role: Predoctoral Fellow. Primary mentor: Susan M. Rawl, PhD, RN, FAAN; Secondary mentor: Catherine E. Mosher, PhD

Educational Enhancement Grant, April 2011, IUPUI Graduate and Professional Student Government

Clinical Psychology Program Travel Grant, April 2011, IUPUI Department of Psychology

HONORS AND AWARDS

Elite 50 Award, April 2015, IUPUI Graduate and Professional Student Government

Research Excellence Award, April 2014, IUPUI Department of Psychology, Clinical Psychology Program

Second Place Behavioral Science by a Graduate Student Poster Award, May 2013, Indiana University Simon Cancer Center Annual Cancer Research Day 2013

Clinical Psychology Award (for outstanding clinical work), March 2013, IUPUI Department of Psychology, Clinical Psychology Program

Honorable Mention for the Clinical Psychology Award for Citizenship, March 2013, IUPUI Department of Psychology, Clinical Psychology Program

First Place Behavioral Science by a Graduate Student Poster Award, May 2012, Indiana University Simon Cancer Center Annual Cancer Research Day 2012

First Place Poster Award in Outcome Oriented Research, April 2012, Richard L. Roudebush VAMC 4th Annual Scientific Symposium 2012

Graduate School Dean's Citation for Academic Excellence, July 2010, Ball State University

Departmental Honors in Psychology, May 2003, Miami University

President's List, January 2003-May 2003, Miami University

Eshbaugh Botany Scholarship, 2003, Miami University

Parents' Council Certificate of Merit for Community Service, 2003, Miami University

Phi Beta Kappa, National Academic Honor Society, April 2003, Miami University chapter

Psi Chi Honor Society, March 2002, Miami University chapter

Golden Key International Honor Society, October 2002, Miami University chapter

Dean's List, January 2001-December 2002, Miami University

Dean's List, September 1999-December 2000, Wright State University

PEER-REVIEWED PUBLICATIONS

1. Rawl, S.M., Christy, S.M., Monahan, P., Tong, Y., Krier, C., Champion, V.L., & Rex, D. (in press). Tailored telephone counseling increases colorectal cancer screening. *Health Education Research*. Manuscript in press.

2. Winger, J.G., Christy, S.M., & Mosher, C.E. (2015). Associations of health behaviors with Human Papillomavirus vaccine receipt and intentions among female college students. *Journal of Health Psychology*. doi: 10.1177/1359105315569093

3. Christy, S.M., Mosher, C.E., & Rawl, S.M. (2014). Integrating men's health and masculinity theories to explain colorectal cancer screening behavior. *American Journal of Men's Health, 8*, 54-65. doi: 10.1177/1557988313492171

4. Wang, H.L., Christy, S.M., Skinner, C.S., Champion, V.L., Springston, J.K., Perkins, S.M., Tong, Y., Krier, C., Gebregziabher, N., & Rawl, S.M. (2014). Predictors of stage of adoption for colorectal cancer screening among African American primary care patients. *Cancer Nursing, 37*, 241-251. doi: 10.1097/NCC.0b013e3182a40d8d

5. Christy, S.M., & Rawl, S.M. (2013). Shared decision-making about colorectal cancer screening: A conceptual framework to guide research. *Patient Education and Counseling, 91*, 310-317. doi: 10.1016/j.pec.2013.01.015

6. Christy, S.M., Perkins, S.M., Tong, Y., Krier, C., Champion, V.L., Skinner, C.S., Springston, J.K., Imperiale, T.F. & Rawl, S.M. (2013). Promoting colorectal cancer screening discussion: A randomized controlled trial. *American Journal of Preventive Medicine, 44*, 325-329. doi:10.1016/j.amepre.2012.11.032

7. Christy, S.M., Mosher, C.E., Sloane, R., Snyder, D.C., Lobach, D., & Demark-Wahnefried, W. (2011). Long-term dietary outcomes of the FRESH START intervention for breast and prostate cancer survivors. *Journal of the American Dietetic Association, 111*, 1844-1851. doi: 10.1016/j.jada.2011.09.013

MANUSCRIPTS UNDER REVISION

Rawl, S.M., Perkins, S., Tong, Y., Christy, S.M., Krier, C., Wang, H.L., Russell, K., Huang, A.M., Rhyant, B., Lloyd, F., Willis, D., Imperiale, T., Myers, L.J., Champion, V L., Springston, J., & Skinner, C.S. (2015). Computer-delivered tailored intervention increases colorectal cancer screening in low-income African Americans in primary care. Manuscript under revision.

Brittain, K., Christy, S.M., & Rawl, S.M. (2015). Cultural variables related to colorectal cancer screening: Trust, health temporal orientation, health literacy, fatalism, and knowledge. Manuscript under revision.

MANUSCRIPTS IN PREPARATION

Christy, S.M., Winger, J.G., Persons, E., Halpern, L., Danoff-Burg, S., & Mosher, C.E. (2015). Anticipated regret, health beliefs, and HPV vaccination intentions in young adults. Manuscript in preparation.

Christy, S.M., Smith-Howell, E., & Rawl, S.M. (2015). Correlates of cancer fatalism in the context of colorectal cancer screening. Manuscript in preparation.

PRESENTATIONS

National Presentations:

1. Christy, S.M., Brittain, K., & Rawl, S.M. (2014, April). *African American patients' intent to screen for colorectal cancer: Do cultural factors, health literacy, knowledge, age and gender matter?* Poster presented at the 2014 Annual Meeting of the Society of Behavioral Medicine, Philadelphia, PA.

2. Winger, J.G., Christy, S.M., & Mosher, C.E. (2014, April). *Health behaviors associated with HPV vaccine receipt and intentions among undergraduate women.* Poster presented at the 2014 Annual Meeting of the Society of Behavioral Medicine, Philadelphia, PA.

3. Rawl, S., Olofinkua, K., Habermann, B., Christy, S., Perkins, S., Tong, Y., Gebregziabher, N., Mabis M., Krier, C., Mirchandani, A. & Fatima, H. (2014, April). *Colorectal cancer knowledge differentiates people who complete a scheduled colonoscopy and those who do not.* Poster presented at the 2014 Annual Meeting of the Society of Behavioral Medicine, Philadelphia, PA.

4. Olofinkua, K., Rawl, S.M., Habermann, B., Christy, S., Perkins, S., Tong, Y., Gebregziabher, N., Krier, C., Mirchandani, A., Mabis, M., & Fatima, H. (2014, April). Primary care patients who complete colonoscopy after referral and those who do not: Are they different? Poster presented at the 2014 Annual Conference of the National Council of Undergraduate Research, Lexington, KY.

5. Christy, S.M., Persons, E., Halpern, L., Danoff-Burg, S., & Mosher, C.E. (2013, July). *Health beliefs, attitudes, and HPV vaccination intention in college men.* Poster presented at the 2013 American Psychological Association Annual Convention, Honolulu, HI.

6. Christy, S., Wang, H., Perkins, S., Tong, Y., Champion, V., Skinner, C., & Rawl, S. (2013, March). *Mediators of change in stage of adoption following two colorectal screening interventions.* Poster presented at the 2013 American Society of Preventive Oncology Annual Meeting, Memphis, TN.

7. Rawl, S.M., Perkins, S., Tong, Y., Christy, S., Champion, V.L., & Skinner, C.S. (2012, November). *Computer-tailored intervention increases colon cancer screening in low-income Black primary care patients: Results of a randomized trial*. Paper presented at the 2012 Oncology Nursing Society Research Conference, Phoenix, AZ.

8. Christy, S.M., Perkins, S., Tong, Y., Gebregziabher, N., Krier, C., Champion, V.L., Skinner, C.S., Springston, J., Rhyant, B., Imperiale, T., & Rawl, S.M. (2012, September). *Predictors of colorectal cancer screening discussions between Black primary care patients and their providers.* Paper presented at the 2012 National State of the Science Congress on Nursing Research, Washington, D.C.

9. Rawl, S.M., Perkins, S., Tong, Y., Krier, C., Christy, S., Wang, H-L., Champion, V.L., Springston, J., & Skinner, C.S. (2012, September). *Increasing colorectal cancer screening in low-income Black primary care patients: 6 month results of a randomized trial.* Poster presented at the 2012 National State of the Science Congress on Nursing Research, Washington, D.C.

10. Wang, H-L., Skinner, C.S., Champion, V.L., Springston, J., Perkins, S., Tong, Y., Krier, C., Gebregziabher, N., Christy, S., & Rawl, S.M. (2012, September). *Factors predicting stage of adoption for fecal occult blood testing and colonoscopy among non-adherent African Americans.* Paper presented at the 2012 National State of the Science Congress on Nursing Research, Washington, D.C.

11. Christy, S.M., Mosher, C.E., Lipkus, I., Sloane, R., Snyder, D.C., Lobach, D.F., & Demark-Wahnefried, W. (2012, June). *Long-term outcomes of the FRESH START trial: Exploring the role of self-efficacy in cancer survivors' maintenance of dietary practices and physical activity*. Poster presented at the 2012 Biennial Cancer Survivorship Conference, Arlington, VA.

12. Wang, H-L., Skinner, C.S., Champion, V.L., Springston, J., Perkins, S., Tong, Y., Krier, C., Gebregziabher, N., Christy, S., & Rawl, S.M. (2012, May). *Colorectal cancer screening in non-adherent Black Americans.* Poster presented at the 2012 Cancer, Culture & Literacy Conference, Clearwater Beach, FL.

13. Christy, S.M., Perkins, S., Tong, Y., Gebregziabher, N., Krier, C., Champion, V., Skinner, C.S., Springston, J., Rhyant, B., Imperiale, T., & Rawl, S. (2012, April). *Predictors of colorectal cancer screening discussions between African-American patients and their providers.* Poster presented at the 2012 Annual Meeting of the Society of Behavioral Medicine, New Orleans, LA.

14. Christy, S.M., Mosher, C.E., Sloane, R., Snyder, D.C., Lobach, D., & Demark-Wahnefried, W. (2011, April). *Long-term dietary outcomes of the FRESH START intervention for breast and prostate cancer survivors.* Poster presented at the 2011 Annual Meeting of the Society of Behavioral Medicine, Washington, D.C.

Local Presentations:

15. Christy, S.M., Brittain, K., & Rawl, S.M. (2014, May). *African American patients' intent to screen for colorectal cancer: Do cultural factors, health literacy, knowledge, age and gender matter?* Poster presented at the 2014 Indiana University Simon Cancer Center Cancer Research Day, Indianapolis, IN.

16. Winger, J.G., Christy, S.M., & Mosher, C.E. (2014, May). *Health behaviors associated with HPV vaccine receipt and intentions among undergraduate women.* Poster presented at the 2014 Indiana University Simon Cancer Center Cancer Research Day, Indianapolis, IN.

17. Van Antwerp, L.R., Christy, S.M., Mosher, C.E., Rawl, S.M., & Haggstrom, D.A. (2014, April). *Predictors of colorectal cancer screening adherence among male veterans.* Poster presented at the 2014 IUPUI Research Day, Indianapolis, IN.

18. Christy, S.M., Wang, H., Perkins, S.M., Tong, Y., Champion, V.L., Krier, C., Myers, L.J., Imperiale, T., Skinner, C.S., & Rawl, S.M. (2013, May). *Change in stage of adoption following two colorectal cancer screening interventions*. Poster presented at the 2013 Indiana University Simon Cancer Center Cancer Research Day, Indianapolis, IN.

19. Christy, S.M., Wang, H., Perkins, S.M., Tong, Y., Champion, V.L., Krier, C., Myers, L.J., Imperiale, T., Skinner, C.S., & Rawl, S.M. (2013, May). *Change in stage of adoption following two colorectal cancer screening interventions*. Poster presented at the 2013 Richard L. Roudebush VAMC 4th Annual Scientific Symposium, Indianapolis, IN (presented by C. Krier).

20. Rawl, S.M., Christy, S., Perkins, S., Tong, Y., Krier, C., Wang, H-L., Champion, V. L., Myers, L.J., Imperiale, T., Willis, D., Rhyant, B., Springston, J., & Skinner, C.S. (2013, April). *Interventions to promote colorectal cancer screening in primary care: Results of a randomized trial.* Poster presented at the 2013 IUPUI Research Day, Indianapolis, IN.

21. Van Antwerp, L.R., Winger, J.G., Christy, S.M., & Mosher, C.E. (2013, April). *Relationships between health behaviors and HPV vaccine receipt and intentions among undergraduate women.* Poster presented at the 2013 IUPUI Research Day, Indianapolis, IN.

22. Christy, S.M., Perkins, S., Tong, Y., Gebregziabher, N., Krier, C., Champion, V., Skinner, C.S., Springston, J., Rhyant, B., Imperiale, T., & Rawl, S. (2012, May). *Predictors of colorectal cancer screening discussions between African-American patients and their providers.* Poster presented at the 2012 Indiana University Simon Cancer Center Cancer Research Day, Indianapolis, IN.

23. Christy, S.M., Perkins, S., Tong, Y., Gebregziabher, N., Krier, C., Champion, V., Skinner, C.S., Springston, J., Rhyant, B., Imperiale, T., & Rawl, S. (2012, April). *Predictors of colorectal cancer screening discussions between African-American patients and their providers.* Poster presented at the 2012 Richard L. Roudebush VAMC 4th Annual Scientific Symposium, Indianapolis, IN.

RESEARCH EXPERIENCE

Co-investigator and Research Team Member, October 2011-July 2015
Colonoscopy Scheduled and Subsequent Test (COAST) Research Team
School of Nursing
Indiana University, Indianapolis, Indiana

Duties: Co-designed mixed methods study; co-wrote Abstract, Specific Aims, and Approach sections of successful grant application for pilot study funding; attend research team meetings; perform qualitative data coding.

Supervisor: Susan M. Rawl, PhD, RN, FAAN

Research Team Member, July 2011-July 2015
Promoting African American Colon Testing (PACT) Research Team
School of Nursing
Indiana University, Indianapolis, Indiana

Duties: Conduct data analyses and prepare manuscripts; attend research team meetings.

Supervisor: Susan M. Rawl, PhD, RN, FAAN

Graduate Research Assistant, August 2010-June 2014
Department of Psychology
Indiana University-Purdue University Indianapolis, Indianapolis, Indiana

Duties: Recruited participants and conducted assessments for NCI-funded research on the support needs and preferences of lung cancer patients and their caregivers; co-designed studies on HPV vaccination acceptance and other health behaviors; conducted literature searches and compiled measures; conducted data analyses and prepared manuscripts; trained, mentored, and supervised undergraduate research assistants; collected information from medical records; maintained study databases and participant files; assisted with intervention design and grant preparation; provided training in clinical skills and medical chart data extraction to research assistants and trial therapists.

Supervisor: Catherine E. Mosher, PhD

Data Manager, August 2009-January 2010
Department of Counseling Psychology
Ball State University, Muncie, Indiana

Duties: Assisted with data entry and organization for a doctoral student's dissertation entitled, *The moderating and mediating effects of religious coping on quality of life in long-term survivors of cancer*.

Supervisor: Sarah Jenkins, MA, Doctoral Candidate
Donald Nicholas, PhD, HSPP

Student Researcher, August 2007-July 2010
Health Psychology Research Team
Department of Counseling Psychology
Ball State University, Muncie, Indiana

Duties: Assisted other student researchers through survey preparation and data entry; discussed research methods; assisted in data collection for meta-analysis.

Supervisor: Donald Nicholas, PhD, HSPP

Undergraduate Research Assistant, August 2002-May 2003
Department of Psychology
Miami University, Oxford, Ohio

Duties: Mentored independent study experience in APA-style manuscript writing.

Supervisor: Z. Michael Nagy, PhD

CLINICAL EXPERIENCE

Clinical Health Psychology Intern, July 2014-June 2015
VA Connecticut Healthcare System-West Haven campus
West Haven, Connecticut

Integrated Primary Care Clinic (August 2014-June 2015):
Duties: Conduct time-limited, evidence-based individual psychotherapy (e.g., Cognitive-Behavioral Therapy, Motivational Interviewing) and assessments with veterans presenting with a wide range of co-morbid physical and psychological diagnoses in order to improve health behaviors and medical self-management strategies and to facilitate coping with medical diagnoses as well as prevention of chronic illnesses. Work within a multidisciplinary team of medical care providers. Serve in a consultation role to other medical care providers to improve patient care.

Supervisors: Jessica Barber, PhD, Laura Blakley, PhD, Caroline Schmidt, PhD and John Sellinger, PhD

Cancer Center (January 2015- June 2015):
Duties: Conduct assessments and provide individual and group therapy to individuals facing a hematology or oncology diagnosis. Conduct evaluations for bone marrow transplantation.

Supervisor: Jessica Barber, PhD

Integrated Pain Clinic (August 2014-December 2014):
Duties: Conduct cognitive-behavioral assessments with veterans with pain conditions in order to determine the biological, psychological, and social contributors to their pain experience. Work within a multidisciplinary team which includes psychology, pain medicine, physiatry, physical therapy, pharmacy, and substance abuse treatment professionals in order to provide a comprehensive pain evaluation and develop a pain management plan and recommendations.

Supervisor: John Sellinger, PhD
Preceptor: Laura Wandner, PhD

Inpatient Consultation-Liaison Service (July 2014- June 2015):
Duties: Conduct assessments and provide psychotherapy to individuals who are currently inpatient in a variety of medical and surgical units within the medical center. Serve as a consultant and make recommendations to medical staff surrounding patients' psychosocial functioning and coping.

Supervisors: Jessica Barber, PhD, Laura Blakley, PhD, Caroline Schmidt, PhD, and John Sellinger, PhD
Preceptor: Kristina Schumann, PhD

Clinical Health Psychology Assessment Clinic (August 2014- June 2015):
Duties: Conduct evaluation and participate in treatment planning for individuals diagnosed with a variety of co-morbid physical and psychological diagnoses. Write reports following clinical interview and psychological evaluation for organ transplantation.

Supervisor: Jessica Barber, PhD
Preceptors: Aaron Martin, PhD and Noel Quinn, PhD

Smoking Cessation Clinic (August 2014-November 2014):
Duties: Co-facilitate smoking cessation group by providing psychoeducation around smoking cessation strategies through Cognitive-Behavioral and Motivational Interviewing techniques.

Supervisor: Lisa Frantsve, PhD
Preceptor: Anthony Brinn, PsyD

Weight Management Clinic (July 2014-October 2014 and March 2015- June 2015):
Duties: Co-facilitate the Managing Overweight/Obese Veterans Everywhere (MOVE!) weight management groups with colleagues from the physical therapy and nutrition services. Provide psychoeducation surrounding behavioral and cognitive weight management strategies.

Supervisor: Lindsey Dorflinger, PhD
Preceptor: Leila Islam, PhD

Interdisciplinary Stroke Clinic (November 2014-February 2015):
Duties: Conduct assessments with individuals who have suffered a stroke or other cerebrovascular injury in order to identify risk factors for subsequent brain injuries. Work within an interdisciplinary team of neurology, pharmacy, physical therapy, and psychology in order to make recommendations for behavioral change to reduce secondary stroke risk.

Supervisor: Valerie Weisser, PhD

Palliative Care (March 2015- June 2015):
Duties: Provide supportive therapy and conduct assessments with individuals who are receiving inpatient palliative care services in a variety of medical and surgical units. Serve as a consultant and make recommendations to medical staff surrounding patients' psychosocial functioning and coping.

Supervisor: Laura Blakely, PhD

Audiology Clinic (March 2015- June 2015):
Duties: Co-facilitate Cognitive-Behavioral Therapy-based tinnitus management group and conduct cochlear implant evaluations.

Supervisor: Caroline Schmidt, PhD

Practicum Student, January 2013-April 2013
Richard L. Roudebush VA Medical Center
Indianapolis, Indiana
Duties: Conducted neuropsychological and personality assessments with veterans with a variety of referral questions including traumatic brain injuries, compensation and pension evaluations, dementia, and severe mental illness. Wrote integrated reports based upon clinical interview and assessment results.

Supervisor: Kriscinda Whitney, PhD, HSPP

Peer Supervisor, September 2012-May 2013
Indiana University-Purdue University Indianapolis, Department of Psychology
Indianapolis, Indiana

Duties: Provided peer supervision to Clinical Psychology PhD students who were earlier in their practica careers.

Supervisor: John Guare, PhD, HSPP

Practicum Student, August 2012-December 2012
Larue D. Carter Memorial Hospital
Indianapolis, Indiana

Duties: Provided group and individual therapy (Cognitive-Behavioral Therapy, Dialectical Behavioral Therapy, Behavioral Therapy) to adult patients in an inpatient setting. Co-led Borderline Personality Disorder and Transition Skills groups. Conducted assessments with individuals diagnosed with severe mental illnesses.

Supervisor: Kristine M. Chapleau, PhD, HSPP

Practicum Student, August 2011-April 2012
Richard L. Roudebush VA Medical Center
Indianapolis, Indiana

Duties: Provided individual and group therapy (Cognitive-Behavioral Therapy, Cognitive Processing Therapy, Acceptance and Commitment Therapy, Motivational Interviewing) to adult clients in an integrated primary care setting. Led Chronic Pain Management and Managing Overweight/Obese Veterans Everywhere (MOVE!) Level 2 weight management groups. Conducted mood, personality, intelligence, and neuropsychological assessments. Wrote integrated reports following clinical interview and psychological evaluation for Interferon treatment and Spinal Cord Stimulator implants.

Supervisor: Jennifer Lydon-Lam, PhD, HSPP

Practicum Student, April 2011-August 2011
Adult Outpatient Clinic, Department of Psychiatry, Indiana University School of Medicine, University Hospital
Indiana University Simon Cancer Center
Indianapolis, Indiana

Duties: Provided individual therapy (Cognitive-Behavioral Therapy, Acceptance and Commitment Therapy) to cancer patients and family caregivers at Indiana University Simon Cancer Center. Provided individual therapy (Cognitive-Behavioral Therapy, Acceptance and Commitment Therapy) to adult clients at Adult Outpatient Clinic.

Supervisor: Natalie Dattilo, PhD, HSPP

Interim Program Director, May 2010-June 2010
Cancer Support Community, formerly The Wellness Community of Central Indiana
Indianapolis, Indiana

Duties: Led bi-weekly Facilitator Supervision meetings for LCSW and LFMT staff; created, designed, and planned program calendar and secured speakers for programs; served as point person for individuals interested in programming; maintained program statistics and completed various administrative tasks; created upcoming program marketing materials; trained incoming Program Director; co-organized Survivors Symposium 2010 and served as moderator of Survivor Panel at Survivors Symposium 2010.

Clinical Program Intern, August 2009-May 2010
Cancer Support Community, formerly The Wellness Community of Central Indiana
Indianapolis, Indiana

Duties: Conducted cancer patient and caregiver support groups and intake interviews; engaged in public outreach and programming; maintained program statistics; provided individual counseling; fulfilled Program Director tasks while Program Director was on maternity leave from September through December 2009.

Supervisors: Alan Maugherman, PhD, HSPP
Janet Wilson, MSW, LCSW
Laura Weiger, MSW, LCSW

Counselor in training, May 2009-July 2009
Ball State University Counseling Practicum Clinic
Muncie, Indiana

Duties: Provided individual and family counseling (Interpersonal Therapy, Cognitive-Behavioral Therapy) to the public.

Supervisors: Donald Nicholas, PhD, HSPP
Kristen Jones, MA

Counselor in training, May 2009-July 2009
Ball State University Wellness Group
Muncie, Indiana

Duties: Co-led psycho-educational group for older adults on health-related and psychosocial topics in residential setting.

Supervisors: Donald Nicholas, PhD, HSPP
Summer Ibarra, MA
Aarika Vannatter, MA

Counselor in training, January 2009-May 2009
Wilson Middle School
Muncie, Indiana

Duties: Provided individual, family, and group counseling to students and their parents (Interpersonal Therapy, Cognitive-Behavioral Therapy).

Supervisors: Alan Maugherman, PhD, HSPP
Jennifer Walsh, MA

Rape Victim Advocate, October 2002-April 2013
Butler County Crisis & Counseling Center
Oxford, Ohio

Duties: Provided emotional support and information to rape victims via phone and face-to-face contact as volunteer advocate.

Supervisor: Jennifer Weigel, MSW, LISW

MENTORING AND TEACHING EXPERIENCE

Presentation and co-facilitation of Cognitive Behavioral Therapy Skills Training for Yale University School of Medicine Primary Care Residents, March 2015, St. Raphael's Hospital, New Haven, Connecticut

Presented "Personality" guest lecture to undergraduate Introduction to Psychology class, October 2014, University of New Haven, West Haven, Connecticut

Assisted with design and facilitation of Cognitive Behavioral Therapy Skills Training for Yale University School of Medicine Primary Care Residents, October 2014, St. Raphael's Hospital, New Haven, Connecticut

Presented "Anxiety Disorders" guest lecture to undergraduate Abnormal Psychology class, September 2014, University of New Haven, West Haven, Connecticut

Mentored undergraduate Psychology student throughout Honor's thesis project and Capstone course, July 2013-May 2014, IUPUI, Indianapolis, Indiana

Mentored undergraduate Psychology student's successful Undergraduate Research Opportunities Program Project grant application entitled "*Predictors of Colorectal Cancer Screening Adherence among Male Veterans*" awarded by the IUPUI Center for Research and Learning, August 2013-December 2013, IUPUI, Indianapolis, Indiana

Completed the "Seminar in Teaching Psychology" course, May 2012-July 2012, IUPUI, Indianapolis, Indiana

PROFESSIONAL MEMBERSHIPS

American Society of Preventive Oncology, January 2013-Present, Student member

American Psychological Association Division 51: Society for the Psychological Study of Men and Masculinity, January 2013-December 2014, Student member

American Psychological Association Division 12: Clinical Psychology, May 2012-December 2013, Student member

Society of Behavioral Medicine, September 2010-Present, Student member

American Psychological Association Division 38: Health Psychology, 2010, 2012-Present, Student member

Ball State University Social Justice League, May 2009-July 2010

American Psychological Association, September 2007-Present, Student member (APAGS member)

Psychology Club, September 2002-May 2003, Miami University

EDITORIAL ACTIVITIES

Mentored Ad Hoc Manuscript Reviews:

Psycho-Oncology (x2)
Social Science Research
Journal of Consulting and Clinical Psychology

WORKSHOPS ATTENDED

Motivational Interviewing for PACT Clinicians, September 2014
Presenters: Lindsey Dorflinger, PhD, Clinical Psychologist, Health Behavior Coordinator, VA Connecticut Healthcare System, Department of Psychiatry, Yale University School of Medicine
Jacquelyn Wolf MSN, RN, CDE, Health Promotion, Disease Prevention Coordinator, VA Connecticut Healthcare System
Location: VA Connecticut Healthcare System, Newington, Connecticut

Biofeedback for Pain Management, April 2014
Presenter: Eric Scott, PhD, HSPP, Assistant Professor of Clinical Psychology in Clinical Psychiatry, Indiana University
Location: Indiana University-Purdue University Indianapolis, Indianapolis, Indiana

Mixed Methods in the Social, Behavioral, Health Sciences and STEM Fields, February 2014
Presenter: John W. Creswell, PhD, Professor of Educational Psychology, University of Nebraska-Lincoln; Visiting Professor, School of Public Health, Harvard University
Location: Indiana University-Purdue University Indianapolis, Indianapolis, Indiana

Consultation Workshop, October 2013
Presenter: Susan Hickman, PhD, Associate Professor, Indiana University School of Nursing
Location: Indiana University-Purdue University Indianapolis, Indianapolis, Indiana

Scientific Writing from the Reader's Perspective, July 2013
Presenter: George Gopen, JD, PhD, Professor, Duke University
Location: Indiana University-Purdue University Indianapolis, Indianapolis, Indiana

Self-Hypnosis for Chronic Pain Management, April 2013
Presenter: Mark Jensen, PhD, Professor, University of Washington
Location: Indiana University-Purdue University Indianapolis, Indianapolis, Indiana

Consultation Workshop: Focus on Fidelity and Feedback, January 2013
Presenter: Angela Rollins, PhD, Roudebush Veterans Affairs Medical Center
Location: Indiana University-Purdue University Indianapolis, Indianapolis, Indiana

Write Winning Grant Proposals, October 2012
Presenter: John Robertson, PhD, Grant Writers' Seminars & Workshops
Location: Indiana University-Purdue University Indianapolis, Indianapolis, Indiana

Overview of Mental Health and Behavioral Consultation, October 2011
Presenter: Lisa Ruble, PhD, Associate Professor of Educational Psychology, University of Kentucky
Location: Indiana University-Purdue University Indianapolis, Indianapolis, Indiana

Group Schema Therapy Workshop, March 2011
Presenters: Joan Farrell, PhD, Adjunct Professor, Indiana University School of Medicine, Department of Psychiatry and Training Director of the Center for Borderline Personality Disorder Treatment & Research; Ida Shaw, M.A., Director of BASE Consulting Group
Location: Indiana University-Purdue University Indianapolis, Indianapolis, Indiana

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WORK EXPERIENCE

Museum Administrator, January 2004-January 2009
Indiana Landmarks, formerly Historic Landmarks Foundation of Indiana
Indianapolis, Indiana

Duties: Gave invited podium presentations at Association of American Museums conference in 2005 and Association of Indiana Museums conference in 2006; performed budget planning and maintenance duties; completed grant writing and fund-raising duties; performed public speaking tasks including television interviews; executed all duties described below in Program Manager position.

Program Manager, July 2003-December 2003
Indiana Landmarks, formerly Historic Landmarks Foundation of Indiana
Indianapolis, Indiana

Duties: Engaged in exhibit and program research, planning, and production; performed public speaking tasks through guided tours, education and special event program presentation, and radio programming; mentored undergraduate and graduate Public History and Museum Studies student interns; engaged in frequent contact with the public, volunteers, interns, advisory committee members, and board members.

SERVICE ACTIVITIES

University Service:

Campus Representative for American Psychological Association, Society of Clinical Psychology (Division 12), May 2012-December 2013
Indiana University-Purdue University Indianapolis
Indianapolis, Indiana

Campus Representative for American Psychological Association of Graduate Students Advocacy Coordinating Team (ACT), September 2010-September 2011
Indiana University-Purdue University Indianapolis
Indianapolis, Indiana

Social Justice League Website Committee Member, February 2010-July 2010
Ball State University
Muncie, Indiana

Graduate Studies Committee member, September 2009-July 2010
Department of Counseling Psychology
Ball State University
Muncie, Indiana

Community Service:

American Cancer Society, 2011
2011 Relay for Life Team Co-Captain
Indianapolis, Indiana

Board of Directors Member, October 2007-January 2009
Secretary of the Board
Chair of the Nominating Committee
Association of Indiana Museums
Indianapolis, Indiana

Board of Directors Member, May 2007-July 2008
Old Centrum Foundation
Indianapolis, Indiana