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**THE BIG FIVE AND UTILIZATION OF THE PROSTATE
CANCER TESTING: EVIDENCE FOR THE INFLUENCE OF
NEUROTICISM, EXTRAVERSION AND
CONSCIENTIOUSNESS**

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Läbiv pealkiri: Big Five and Prostate Cancer Testing

Tartu 2012

Abstract

The main purpose of this paper was to determine the associations between Big Five personality traits and attendance at prostate cancer testing in Estonia. To accomplish this aim, 371 men aged 50-70 completed the short form of Big Five Personality test and a questionnaire on their attendance in prostate cancer testing and intention to attend in the future. Correlations and analysis of variance were conducted to estimate the associations between Big Five personality traits and attendance at prostate cancer testings. Binary logistic regression was used to assess the influence of personality traits on intentions to attend prostate cancer testing in the future. As hypothesized, neuroticism had a significant inverse association and extraversion and conscientiousness had a significant positive association with prostate cancer testing. The present study supports current theory and research that point to a link between personality and health behaviors and extends previous findings on cancer screening behaviors to prostate cancer testing. A better understanding of the association between personality and prostate cancer testing attendance could lead to the establishment of effective campaigns and community messages to promote prostate cancer screenings and motivate men to attend.

Suur viisik ja eesnäärmevähi uuringus osalemine: tõendid neurootilisuse, ekstravertsuse ja meelekindluse mõju kohta

Kokkuvõte

Käesoleva uurimustöö peamine eesmärk oli teha kindlaks seosed Suure Viisiku isiksuseomaduste ja eesnäärmevähi uuringus osalemise vahel Eestis. Saavutamaks seda eesmärki, täitsid 371 meest vanuses 50-70 Suure Viisiku isiksusetesti lühivormi ja küsimustiku osalemise kohta eesnäärmevähi uuringus ning kavatsuse kohta osaleda tulevikus. Hindamaks seoseid Suure Viisiku ja eesnäärmevähi uuringus osalemise vahel, viidi läbi korrelatsiooni- ja dispersioonanalüüsid. Hindamaks isiksuse mõju kavatsusele osaleda eesnäärmevähi uuringus tulevikus, kasutati binaarset logistilist regressiooni. Nagu hüpoteesis püstitatud, oli neurootilisel oluline negatiivne seos ja ekstravertsusel ning meelekindlusel oluline positiivne seos eesnäärmevähi testimisega. Käesolev uurimustöö toetab olemasolevat teooriat ja uurimustulemusi, mis kinnitavad seost isiksuse ja tervisekäitumise vahel ja laiendab varasemaid tulemusi vähiskriiningutega seotud käitumise kohta ka eesnäärmevähi testimisele. Parem arusaam seosest isiksuse ja eesnäärmevähi uuringus osalemise vahel võib aidata kaasa efektiivsete kampaaniate ja ühiskondlike teadete loomisele, et reklaamida eesnäärmevähi testimist ja motiveerida mehi osalema.

Introduction

Prostate cancer testing

The prostate is a gland located at the base of a man's bladder, behind the pubic bone and in front of the rectum, surrounding the urethra. The prostate's primary function is to produce prostatic fluid, a component of semen. In addition, smooth muscles in the prostate contract during ejaculation to help to propel semen through the urethra. The most common prostate diseases are prostatitis, benign prostatic hyperplasia (BPH) and prostate cancer, the latter being the most serious health problem (Carter & Margolis, 2002).

Prostate cancer (PCa) is the second most frequently diagnosed cancer and the sixth leading cause of cancer death among men worldwide. 914,000 new cases and 258,000 deaths were estimated to occur in 2008 (Ferlay et al. 2010). It is also the most common non-skin tumor malignancy amongst men in Europe, with an estimated 382,000 cases and 90,000 deaths occurred in 2008 (Ferlay, Parkin & Seljarova-Foucher, 2010), ranking it the third most common cause of cancer death amongst men, after lung and colorectal cancers (Ferlay et al., 2010). In America 218,000 estimated cases and over 32,000 deaths were projected to occur in 2010 (Ferrante, Shaw & Scott, 2011).

Over the past two decades PCa incidence has been increasing rapidly. Rates are influenced by early diagnosis by prostate specific antigen (PSA) testing, amongst both symptomatic and asymptomatic men, as well as by the detection of latent cancer in prostate surgery. PSA testing is especially common in certain Northern and Western European countries (Curado, Edwards & Shin, 2007).

Although the annual PCa incidence in Estonia (71.7 per 100,000 in 2006) is lower, than in some other European countries, Estonia has the one of the highest mortality rates of prostate cancer in Europe (over 30 per 100,000 in 2006), followed by other Baltic states and Nordic countries (Denmark, Norway and Sweden) (Bray, Lortet-Tieulent, Ferlay, Forman, Auvinen, 2010).

Prostate cancer screening means the examination of asymptomatic people in order to classify them according to whether they are likely or unlikely to have prostate cancer. There are few, if any, population based organized programmes for PCa in Europe (in contrast to cervix and breast cancer), whilst opportunistic testing (case-finding) amongst men with or without urological symptoms is however common (Bray et al., 2010).

Digital Rectal Examination (DRE) and screening for Prostate Specific Antigen (PSA) are common methods in early detection of PCa (Mistry & Cable, 2003). Some researchers have claimed that the shift to earlier-stage diagnosis is evidence of the effectiveness of screening. Others argue that diagnosing PCa early may not necessarily lead to fewer deaths or that PSA may simply be detecting more indolent cancers (Woolf & Rothermich, 1999), which has led to some controversy over the unproven benefit of PCa screening (Barry, 2009).

Nevertheless the rates of PCa screening in the Western countries have been increasing rapidly. Thus, PCa screening behavior is a topic of growing popularity.

Factors influencing participation in prostate cancer screening

There are certain demographic and social factors that determine the utilization of the PCa screening – family history, marital status, age, general health, educational level and income (indicating social status) (Wallner et al., 2008; Nijs, et al. 2000).

Absence of urinary symptoms was the most frequent reason why men did not accept an invitation for screening in the European Randomized Study of Screening for Prostate Cancer (ERSPC) trial (Nijs, Essink-Bot, DeKoning, Kirkels, & Schroder, 2000). If more men knew that PCa is asymptomatic in the early and curable stages, interest in screening might increase. When asked to list cancers they had heard of, only 40% of men surveyed mentioned PCa unprompted, and only 1% were aware that PCa can be asymptomatic (Evans, Brotherstone, Miles & Wardle, 2005). There is low awareness of PCa and limited knowledge about symptoms (Schulman, Kirby & Filzpatrick, 2003).

The factors associated with awareness and knowledge about PCa are higher educational attainment, Caucasian ethnicity, higher household income, higher social class, cohabitation with a female partner, and having a history of urinary symptoms (Fitzpatrick, Corcoran & Fitzpatrick, 1998; Chan et al, 2003).

Most of the studies about barriers on PCa screening have concentrated on Black and Hispanic males. These studies reveal the following barriers for PCa screening: obstacles to access (Boyd, Weirich, Weinrich & Norton, 2001; Ford, Vernon, Havstad, Thomas & Davis, 2006; Forrester-Anderson & Forrester Anderson, 2005; Patel, Kenerson & Wang et al, 2010; Shelton, Weinrich & Reynolds, 1999; Wray, McClure, Vijaykumar et al, 2009; Webb et al, 2006), lack of knowledge (Ford et al, 2006; Forrester-Anderson & Forrester Anderson, 2005; Sanchez, Bower, Hart & Spigner, 2007), fear of cancer (Ford et. Al, 2006; Forrester-Anderson

& Forrester Anderson, 2005; Wray et al, 2009), embarrassment (Forrester-Anderson & Forrester Anderson, 2005; Shelton et al., 1999), threat to manhood (Sanchez et al, 2007; Webb et al. 2006) and distrust of the medical system (Forrester-Anderson & Forrester Anderson, 2005; Sanchez et al, 2007; Wray et al, 2009).

The following screening barriers have been found among Caucasian men: perception, that risk of PCa is low, skepticism about benefits of screening, being ill with other conditions (which makes prostate screening low priority), embarrassment or discomfort with digital rectal exams, not wanting to know, confusion over the screening procedure (Ferrante, et al., 2011), logistic reasons, inadequate time for health maintenance, physical forgetfulness, patient characteristics such as comorbidity, limited education/health awareness, prior refusal of care, lack of time, anxiety and depression (Guerra, Jacobs & Holmes, 2007), expense and time involved in testing, information confidentiality, concern about test accuracy, worry about diagnosing cancer and perceived discomfort of testing (Myers, Hyslop, Jennings-Dozier, 2000). Having had a digital rectal examination, perceived PCa susceptibility and fatalism about prostate cancer prevention are negatively associated with the intention to be tested (Myers, Hyslop, Jennings-Dozier, 2000). There are also passive avoiders, who were willing to get screened if their doctor recommended it (Ferrante et al., 2011).

On the other hand – the motives for attending in PCa testing are personal benefit, contribution to science, presence of urological complaints, positive prior experience with health services (Nijs et al., 2000) and belief in the efficacy of prostate cancer screening (Myers, Hyslop, Jennings-Dozier, 2000).

Although the following findings are not about PCa, they might cast light upon the topic, discussing a close area – cancer screenings in general. Reasons discussed for delayed help-seeking behavior for testicular and breast cancer include lack of knowledge, absence of symptoms, wrong attribution of symptoms, or not appreciating their seriousness, fear of cancer, painful examinations, or consequences of cancer treatment, avoidant coping, fearful/fatalistic beliefs that nothing can be done in the event of a cancer diagnosis, or other practical or emotional barriers such as lack of time or embarrassment (Arndt et al, 2003; Bosl et al., 1981; Evans et al., 2005; Tromp, Brouha, De Leeuw, Hordijk, Winnubst et al, 2004; Nijs et al, 2000). Aspects of a traditional male gender role like self-reliance, toughness and emotional control may contribute additionally to men's reasons for not seeking help (Addis & Mahalik, 2003; Courtenay, 2000).

As we can see, there is lots of knowledge about factors influencing prostate cancer screening – on the levels of emotions, beliefs, knowledge, health and social status. On the

other hand, not much information is available on the level of personality factors on screening for PCa.

Many of the barriers listed above are obviously related to personality traits and subjective ways people perceive the world. Negative emotions (fear, embarrassment, distrust, anxiety) are related to neuroticism, positive expectations and belief in personal benefit might be related to extraversion, logistic and time issues might be influenced by conscientiousness. If we knew personality differences in PCa screening behavior, personality could be targeted in community messages.

Since personality is an important predictor of behavior and also related to various health behaviors including cancer screening, an overview on the topic is given.

Personality, health and cancer screening behaviors

The recent decades of personality research have suggested that the five-factor model of personality (“Big Five”, e.g. Goldberg, 1990) is a valid way of describing many salient aspects of individual’s personality. The dimensions that make up the Big Five are Neuroticism, Extraversion, Openness to experience, Conscientiousness and Agreeableness (McCrae & Costa, 1987). To shortly summarize the content of these dimensions the following mnemonic is suggested by John and Srivastava (1999):

E - Extraversion, Energy, Enthusiasm

A - Agreeableness, Altruism, Affection

C - Conscientiousness, Control, Constraint

N - Neuroticism, Negative Affectivity, Nervousness

O - Openness, Originality, Open-mindedness

Since to the best of our knowledge there are no studies about the link between personality and utilization of PCa screening, we give an overview about personality and health behavior in general, including various other cancer screenings.

Neuroticism is a personality trait that represents individual differences in the tendency to experience distress, nervous tension, depression, frustration, guilt, and self-consciousness. These experiences are often associated with irrational thinking, poor control of impulses and cravings, somatic complaints, and ineffective coping (McCrae & Costa, 1987; McCrae & John, 1992). Neuroticism has been found to be positively correlated to cancer mortality

(Nakaya, Hansen & Shapiro, 2006) and inversely related to attending breast cancer screening (Siegler, Feagenes & Rimer, 1995) and gastric cancer screening (Arai et al., 2009).

It is argued that the link between neuroticism (which is a risk factor of depression) and cancer survival could be explained by potential intermediaries such as endocrinological or immunological pathways or compliance with cancer treatment or even suicide (Kiecolt-Glaser & Glaser, 1999, Colleoni et al, 2000, Akechi et al, 2004, Nakaya et al 2006). It is also possible that basic personality traits are associated with unhealthy lifestyle, which is considered an important risk factor for the development of cancer (Dahl, 2010).

Extraversion, a trait defined by being outgoing, sociability and positive emotionality (McCrae & John, 1992; McCrae & Costa, 2003) has been positively correlated with attending breast cancer screening (Chaitchik & Kreitler, 1991), adherence to gastric cancer screening (Arai et al., 2009), and negatively correlated to perceived screening barriers in cervical cancer (Hill & Gick, 2011).

Openness to experience, a personality factor described by traits such as being imaginative, creative and curious, as well as having intellectual interests, aesthetic sensitivity, unconventional values, and a preference for variety (McCrae & John, 1992; McCrae & Costa, 2003) has been found to be inversely related to perceived screening barriers in cervical cancer (Hill & Gick, 2011).

Conscientiousness is a trait defined by competence, dutifulness, a strong work ethic, self-discipline and being neat, well-organized, diligent and achievement-oriented (McCrae & Costa, 1987/2003). Various health behaviors such as adherence to dialysis medical regimens (Christensen & Smith, 1995), healthy eating and exercise (Bogg & Roberts, 2004; Booth-Kewley & Vickers, 1994) have been found to be associated to conscientiousness. Furthermore, conscientiousness is linked to physical and mental well-being (Goodwin & Friedman, 2006), and longevity (Friedman et al., 1995; Kern & Friedman, 2008; Martin, Friedman, & Schwartz, 2007). Conscientiousness has been found to be inversely related to screening barriers in cervical cancer (Hill & Gick, 2011).

Digman (1990) noted, "Agreeableness . . . seems tepid for a dimension that appears to involve the more humane aspects of humanity—characteristics such as altruism, nurturance, caring, and emotional support at the one end of the dimension, and hostility, indifference to others, self-centeredness, spitefulness, and jealousy at the other" (pp. 422-424). Agreeableness has been found to be related to preventive health behavior (Ingledew & Brunning, 1999).

However, there are studies that show no association between personality and cancer screening attendance (Ogawa, Aoki, Shimizu, Kuroishi & Tominaga, 1978).

The previous research lacks data in area of personality associations on PCa screening. Personality is an important device in describing behavior, thus it is important to find relations between personality and PCa screening behavior. How is personality related to utilizing PC screening is yet to be answered. We note that, to the best of our knowledge, there have been no studies of the Big Five with respect to prostate screening. This question is important - as every behavior assumes making some decisions, that a person does according to his/her values and preferences, personality might have influence on screening decisions.

It has been demonstrated that the decision to undertake PSA testing was affected by both social and media factors and it did not appear to be a patient-led decision (Evans, Edwards & Elwyn, 2007). This knowledge could be used in creating community messages, which could be created taking into account the personality traits of men who are less likely to attend prostate testing.

The Present Study

The purpose of the present study was to investigate the influence of the Big Five personality factors on prostate cancer testing. We wanted to differentiate between real behavior and behavioral intention. Thus, attending PCa screening was planned to be measured as real behavior (having attended PCa testing in the past and attending in the present) as well as behavioral intention (intention to attend PCa testing in the future).

We hypothesized a negative correlation between neuroticism and PCa testing, as previous studies have found a similar link between neuroticism and gastric cancer screening (Arai et al., 2009) and breast cancer screening (Siegler et al., 1995). Also, men have mentioned negative emotions such as fear and embarrassment as barriers of PCa testing – neurotic people are more prone to experience these emotions.

We hypothesized that extraversion also would be associated with PCa testing based on past research mentioned earlier that indicates a relationship between extraversion and gastric cancer screening (Arai et al., 2009), cervical cancer screening (Hill & Gick, 2011) and breast cancer screening (Chaitchik & Kreitler, 1991). Also, positive expectations and belief in personal benefit, mentioned by men as motives to attend PCa testing, might be related to extraversion.

Based on the characteristics associated with conscientiousness – self discipline, dutifulness and competence – and the previously noted past research linking

conscientiousness with positive health behaviors (Bogg & Roberts, 2004; Booth-Kewley & Vickers, 1994; Christensen & Smith, 1995; Friedman et al., 1995; Kern & Friedman, 2008; Roberts, Walton, & Bogg, 2005) and cervical cancer screening (Hill & Gick, 2011), we hypothesized that conscientiousness would be positively associated with prostate screening.

We hypothesized that openness to experience would be predictive of PCa testing due to its characteristics of curiosity and preference for variety (McCrae & Costa, 2003), and the previously found association between openness and cervical cancer screening (Hill & Gick, 2011).

Finally, we hypothesized, that there is a positive correlation between agreeableness and PCa testing attendance, as agreeable people tend to be complying and men often go to doctor because their spouse or doctor recommends that (Cohen & Britten, 2003; Robertson, 2009).

Method

Participants

The sample consisted of 371 men, 62 of whom were first-time outpatients at the Andrology Unit of Tartu University Clinic, who participated in prostate cancer testing. Others were convenience sample consisting of patients from other Tartu University clinics and researchers' circle of acquaintances. A total of 600 questionnaires were handed out, with the response rate of 61.8%. Mean age of the participants was 61.17 years ($SD = 6.11$; range 49-74 years), with approximately same age and other characteristics in both outpatients and convenience sample group.

Data collection

Data was collected between 2009 and 2011. The study protocol was approved by the Ethics Review Committee (ERC) on Human Research of the University of Tartu. The participants were recruited by a researcher – they received an explanation with the purpose of the survey and invitation to participate. The subjects were requested to complete the tests alone and in a standard order. They were asked to return the questionnaires as soon as

possible. The participants signed a written informed consent form and confidentiality was assured.

Measures

To measure the past behavior, the participants were asked, "Have you ever participated in prostate cancer testing in your life?" (yes/no). They were also asked about the probability to utilize prostate cancer testing in the future and rate it on 5-point scale (from 1="certainly will not participate" through 3="I can not say" to 5="certainly will participate". These responses were later recoded to 2= „willing to participate“ and 1=background groups, in order to conduct binary logistic regression. Subjects' current status (being an outpatient in andrology clinic and participating in PCa testing or not) was treated as a variable measuring the present behavior (participating in prostate testing or not). Thus, a differentiation between retrospective behavior, actual behavior and behavior intention was made.

The Big Five inventory short form IPIP-S_EST. The Big Five inventory short form IPIP-S_EST (Estonian version, Mõttus, Pullmann & Allik, 2006) assesses the “Big Five” personality dimensions: Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. The 60 self-descriptive statements were measured on a 5-point scale, with responses ranging from strongly disagree (1) to strongly agree (5).

Data Analysis

Prior to conducting the main analyses, the data were screened for normality of the variables. Personality traits were close to normal distribution. Spearman's correlations were conducted to assess the relationship between Big Five personality traits and attending prostate cancer testing in the past and present. A 2x2x5 MANOVA was conducted to evaluate the differences in personality traits between groups (past, present and the combination of the two). Binary logistic regression was conducted to assess the influence of Big Five personality traits on the probability of intention to utilize prostate testing in the future.

Results

Descriptives

Among participants, 20% (n = 75) had utilized PCa testing, 17 % (n=62) were currently attending PCa testing and 20 % (n=74) had intention to utilize PCa testing in the future.

Correlations between personality traits and PCa testing attendance

We wanted to know, how personality factors are related to attending PCa testing in past and present as well as intention to attend in the future. Table 1. displays correlations between the personality factors, past prostate testing attendance, present prostate testing attendance and future intention to utilize PCa testing. As expected, among the personality factors, neuroticism, conscientiousness and extraversion had the strongest correlations with past, present and future attendance. Correlations were between -.34 and .24 (mild to moderate) and strongest with neuroticism. Also, attending PCa testing in present was correlated to intention to attend prostate testing in the future.

Table 1

Personality Factors and prostate cancer testing

Variable	Past	Present	Future
Present	.01		
Future	.06	.17*	
Neuroticism	-.13*	-.34**	-.32**
Extraversion	.15**	.17**	.19**
Openness	.07	.07	-.02
Agreeableness	-.08	.15**	-.03
Conscientiousness	.17**	.24**	-.09

Note:

*p < 0.05

** p < 0.001.

ANOVA for personality traits in PCa testing attendance

Main effects ANOVA was conducted to test whether group membership was significantly associated with the variables. Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness scores were subjected to a main effects ANOVA having two levels of past attendance of prostate cancer testing (yes, no) and two levels of present attendance of prostate cancer testing (yes, no). All effects were statistically significant at the .05 significance level.

The ANOVA revealed a significant main effect for present attendance $F(5, 363) = 11.621, p < .001$ and a significant main effect for past attendance $F(5, 363) = 2.491$. Significant effects were found for neuroticism, extraversion and conscientiousness in both past and present and for agreeableness in present, indicating the differences in personality traits between men who have attended or are attending PCa testing and men who have not attended or are not attending. The results are presented in Table 2.

Table 2

ANOVA table for Big Five personality traits

	Past				F	p	Present				F	p
	No		Yes				No		Yes			
	M	Sd	M	Sd			M	Sd	M	Sd		
N	2.99	0.49	2.82	0.6	4.716	0.03	3.30	0.38	2.76	0.57	49.479	0.00
E	2.76	0.4	2.93	0.49	4.648	0.03	2.79	0.36	2.93	0.50	6.429	0.01
O	3.06	0.45	3.09	0.47	0.117	0.73	3.02	0.29	3.09	0.48	1.246	0.27
A	3.20	0.6	3.27	0.58	0.808	0.37	3.09	0.42	3.30	0.61	6.432	0.01
C	3.29	0.29	3.52	0.64	7.289	0.00	3.12	0.51	3.54	0.62	24.578	0.00

Note: $df=1, n=363$

Then, Factorial ANOVA was conducted, to evaluate the interactions between past and present attendance. Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness scores were subjected to a two-way analysis of variance having two levels of past attendance of PCa testing (yes, no) and two levels of present attendance of PCa testing

(yes, no). All effects were statistically significant at the .05 significance level. Interaction between past and present attendance was non-significant $F(5, 344) = 1.747, p > .05$

Binary Logistic Regression

Binary logistic regression was conducted to evaluate which personality traits predict the intention to utilize PCa testing in the future. First regression model was made adding Neuroticism, Extraversion, Openness, Agreeableness, Conscientiousness and age. Only Neuroticism and Extraversion were statistically significant ($p < .05$). A new model was created consisting of these two. Various combinations of personality traits were also tested, but the model consisting of Neuroticism and Extraversion explained the most variability (Cox and Snell R squared = .133; Nagelkerke R squared = .209).

Table 3. reports the results for logistic regression analysis for future prostate cancer testing attendance. Lower neuroticism and higher extraversion were associated with intention to utilize prostate cancer testing.

Table 3

Logistic regression analysis: Modeled probability that future intention=yes

Predictor	β	SE β	Wald's X^2	df	p	e β (odds ratio)	95% CI for e β
N	-1.715	.324	28.076	1	.000	.180	.095; .339
E	.889	.341	6.798	1	.009	2.432	1.247; 4.745

Note: CI=95% Confidence interval

Discussion

The aim of this study was to determine the associations between Big Five personality traits and attending in prostate cancer testing. To accomplish this aim, 371 men aged 50-70 were assessed with the short form of Big Five Personality test and a questionnaire about their attendance in PCa testing in past and present as well as intention to attend in the future.

Our results suggest that personality traits are important predictors of utilizing prostate cancer testing in the past and present as well as intending to do so in the future. Neuroticism and extraversion were associated with attending PCa testing in the past and present as well as the intention to attend PCa testing in the future. Conscientiousness was associated with attending PCa testing in the past and present. Agreeableness was associated with attending PCa testing in the present.

As hypothesized, neuroticism was inversely predictive of attending PCa testing in the past, present and intention to attend in the future. These findings are consistent with previous studies, which have found a similar link between neuroticism and gastric cancer screening (Arai et al., 2009) and breast cancer screening (Siegler et al., 1995). The present study expands previous research about personality and cancer screening behavior to behavioral intention. Although on one hand neurotic people tend to worry more about their health and may even be in higher risk for cancer, it is possible, that fear and anxiety prevents them from visiting a doctor. Previous studies have found that negative emotions such as fear and embarrassment are barriers of cancer testing. Thus it is understandable, that people with lower neuroticism are more prone to test for prostate diseases.

Extraversion was predictive of prostate cancer testing attendance in past, present and intention to test in the future. The effects for past and present are consistent with previous studies, which have found a positive correlation between extraversion and gastric cancer screening (Arai et al., 2009), cervical cancer screening (Hill & Gick, 2011) and breast cancer screening (Chaitchik & Kreitler, 1991). Extraverts are outgoing, sociable and tend to feel positive emotions (McCrae & John, 1992; McCrae & Costa, 2003). These traits can improve the probability to utilize prostate cancer screening, as extraverts are more optimistic and find it easier to socialize with new people. As positive experiences are a major characteristic of extraversion, these findings are also consistent with the findings that positive prior experience with health services (Nijs et al., 2000) and belief in the efficacy of prostate cancer screening (Myers, Hyslop, Jennings-Dozier, 2000) are motives for prostate testing.

As hypothesized, conscientiousness was predictive of prostate cancer testing attendance in past and present. There was no effect for conscientiousness in intention to attend PCa testing in the future. The findings for past and present are consistent with previous studies, which have found a link between conscientiousness and positive health behaviors (Bogg & Roberts, 2004; Booth-Kewley & Vickers, 1994; Christensen & Smith, 1995; Friedman et al., 1995; Kern & Friedman, 2008; Roberts et al., 2005) and cervical cancer screening (Hill & Gick, 2011).

As hypothesized, agreeableness was associated to PCa testing in the present but not in the past or intention to attend in the future. This finding is consistent with previous literature about the association between agreeableness and preventive health behavior (Ingledeu & Brunning, 1999). Agreeable people might be more willing to attend PCa testing, since men often go to doctor because their spouse or doctor recommends that (Cohen & Britten, 2003; Robertson, 2009).

Hypothesis about openness to experience was not supported. Openness to experience is often described as artistic and intellectual curiosity. It is possible that visiting a doctor for prostate testing is not one of those experiences. Likewise, openness to experience hasn't been found to be correlated to health behaviors in previous studies as strongly as for example neuroticism or conscientiousness.

To our knowledge, the present study is the first to investigate the associations between Big Five personality traits and attending prostate cancer testing. Past research on associations between personality and other cancer screenings and health behavior in general supports the findings of the present study. This study also brings forth some future research ideas. Big Five personality dimensions also have subscales, which could be studied in order to clarify these findings.

The study has several limitations. First, we don't know, if the men who stated that they would attend PCa testing in the future, will really do so. The study was correlational and we only know the intention of these men at a certain moment. Second, we don't know the results of men who refused to participate in the study. This could possibly bias the results. Finally, in the present study, a short form of the Big Five inventory was used. Future studies should consider using personality scales that allow to assess different facets of each Big Five trait as well. This could help to clarify the findings in the present study that were contrary to hypotheses.

The study has theoretical and practical implications. The results support previous findings in the field of personality and cancer screening as well as give new insights about prostate cancer testing is specific, which has been not been studied before in relation to personality traits. The methodological advantage of this study compared to other similar studies was that there was a differentiation between behavior (in the present and past) and intention to behave (in the future). Intention to attend probably distinguishes men who are going to attend prostate cancer testing in the future from those, who are not. Thus, if we know the association between personality and PCa testing attendance, we can use this knowledge to create community messages and effective campaigns to promote attendance at prostate

disease testing program. These community messages can be created taking into account the personality traits of men who are less likely to attend. Similar idea is suggested by Arai et al. (2009) for gastric cancer screening promotion. Attendance among people high in neuroticism might be improved by taking into account the neurotic aspects of their personality. For instance, providing emotional support to relieve any concerns about screening results, pointing out the benefit to be gained from a screening program, and minimizing any anxiety or discomfort during the test (Arai et al., 2009). Low extraversion could be tackled by emphasizing privacy and positive expectations. Low conscientiousness could be addressed by offering the opportunity to test for prostate diseases and regularly reminding about it by physicians.

In conclusion, this study supports current theory and research that point to a link between personality and health behaviors and extends previous findings on cancer screening behaviors to prostate cancer testing.

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Käesolevaga kinnitan, et olen korrekselt viidanud kõigile oma töös kasutatud teiste autorite poolt loodud kirjalikele töödele, lausetele, mõtetele, ideedele või andmetele.

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