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UNDERSTANDING THE RELATIONSHIP BETWEEN SEXUAL TRAUMA AND
SCREENINGS

EMILY N. KARAKIS

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University of Akron

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This thesis has been approved
for the Department of PSYCHOLOGY
and the college of Graduate studies by

Thesis Chairperson, Dr. Lisa Doane, Ph.D.

Department & Date

Committee Member, Dr. Boaz Kahana, Ph.D.

Department & Date

Methodologist, Dr. Michael Horvath, Ph.D.

Department & Date

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ABSTRACT

The most common cause of cervical cancer in women is the Human Papillomavirus (HPV) (Cokkinides, Bandi, Siegel, Warn, & Thun, 2007). Survivors of sexual assault are at a high risk for contracting HPV and other sexually transmitted infections (Lee, Westrup, Ruzek, Keller, & Weitlauf, 2007), therefore placing them at higher risk of developing cervical cancer. Unfortunately, these women are less likely than non-survivors to have cervical cancer screenings (Bazargan, Bazargan, Farooq, & Baker, 2004). Previous research has suggested that post-traumatic stress disorder (PTSD) and locus of control (LOC) may have some influence on screening participation in sexual assault survivors. This study investigates the relationship between sexual trauma, PTSD, LOC, and cervical cancer screenings. More specifically, we aim to examine if PTSD and LOC have mediation effects on the relationship between sexual trauma and cervical cancer screenings.

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CHAPTER I

INTRODUCTION

1.1 Background and Purpose

Survivors of sexual assault are at serious risk for both psychological and physical complications following the assault (Coker, Sanderson, Fadden, & Pirisi, 2000). The Department of Defense defines sexual assault as "offenses of rape, non-consensual sodomy, unwanted sexual contact, and attempts to commit these offenses" (Williams & Bernstein, 2011). One potential psychological consequence, post-traumatic stress disorder (PTSD), is extremely prevalent in sexual assault survivors. Survivors who have experienced sexual assault are more likely to develop PTSD (30.8% lifetime prevalence) than survivors of other types of civilian trauma (17.9% lifetime prevalence) (Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993). PTSD can severely interfere with an individual's daily functioning by forcing them to relive their trauma through flashbacks and causing avoidance of trauma-related places and events. These individuals also may

experience the following that can impact their day-to-day activities: difficulty concentrating and sleeping, irritability, and an exaggerated startle response.

Another potential psychological consequence is the development of an external locus of control (LOC). The dynamics of assault leave survivors feeling powerless (Porter & Long, 1999). Assault survivors often feel that they have little to no control over their environment and themselves (Porter & Long, 1999). It has been found that rape survivors exhibit diminished feelings of control (Branscombe, Wohl, Owen, Allison, & N'gbala, 2003). These reduced feelings of control may cause an individual to develop an external LOC, in which they believe that events that occur within their personal world are due to fate or chance. This external LOC could contribute to a reduction in self-care behaviors (Simoni & Ng, 2002).

In addition to the psychological effects of sexual assault, there are also associated physical effects. During an attack, survivors are often exposed to unprotected sex that places them at high risk of contracting a sexually transmitted infection (STI) (Lee, Westrup, Ruzek, Keller, & Weitlauf, 2007; Lemon, Verhoek-Oftedahl, & Donneley, 2002). The most common STI in the United States is the Human Papillomavirus (HPV) with nearly 6.2 million individuals newly infected each year. HPV is the most common cause of cervical cancer in women, accounting for approximately 70% of the cervical cancer diagnoses (Cokkinides, Bandi, Siegel, Warn, & Thun, 2007). HPV can be detected and treated through Pap smear tests before becoming cancerous. In fact, the likelihood of survival is nearly 100% in women found to have precancerous lesions when appropriate evaluation, treatment, and follow-up takes place (Cokkinides et al., 2007). Evidence has been found that suggests that survivors of sexual assault are less likely than

non-survivors to have routine cervical cancer screenings for various reasons (Bazargan, Bazargan, Farooq, & Baker, 2004; Loxton, Powers, Schofield, Hussain, & Hosking, 2009). This places these women at higher risk for contracting cervical cancer that could potentially be prevented.

A review of the literature suggests that PTSD and LOC may play some role in the motivation behind the decision of many survivors of assault to not have cervical cancer screenings. The purpose of the current study is to explore reasons that women do not have routine cervical cancer screenings as well as to examine the relationship between PTSD and LOC with cervical cancer screening in order to help us recognize how these two constructs may fit into the overall picture. It is exceedingly important to better understand survivor's underlying rationale for not having routine screenings in order to help these women avoid a lethal illness that can easily be averted.

1.2 Factors for Avoidance of Screening

Previous research has found a multitude of factors that may inhibit sexual assault survivors from obtaining cervical cancer screening. The most prevalent reason that women in the general population, and survivors in particular, do not obtain a screening is they either have no education about or have been given misinformation on STIs, cervical cancer, and cervical cancer screening (Ackerson, 2010; Ackerson, 2011; Bazargan et al., 2004; Fylan, 1998; Gillam, 1991; Ko & Hsu, 2005; Weitlauf et al., 2010). Many women avoid screenings because of a lack of a female doctor or screener to perform the procedure (Ackerson, 2011; Fylan, 1998; Lee et al., 2007). Some women have reported that the screening has made them feel powerless, as though they have a lack of control

(Ackerson, 2011; Leeners et al., 2007; Robohm & Bутtenheim, 1996). Another reason is that these women believe that the pap smear will cause them to have flashbacks to their abuse (Ackerson, 2010; Leeners et al., 2007; Seng, Sparbel, Low, & Killion, 2002; Weitlauf et al., 2010). Additionally, childhood sexual abuse has been shown to be related to the avoidance of screenings (Farley, Golding, & Minkoff, 2002; Leeners et al., 2007). Finally, the following have been found to be common factors associated with the avoidance of pap smears among both assault survivors and women in the general population: a fear of pain during the examination (Fylan, 1998; Gillam, 1991; Leeners et al., 2007; Robohm & Bутtenheim, 1996), a fear of cancer (Fylan, 1998), a fear of embarrassment during the examination (Fylan, 1998; Gillam, 1991; Weitlauf et al., 2010), anxiety caused by receiving an abnormal pap smear result (Fylan, 1998), a poor understanding of screening procedures (Fylan, 1998), and a need for additional information (Fylan, 1998).

1.3 Dangers of Avoiding Screenings

During a sexual assault, survivors have likely been exposed to unprotected sex, which increases their odds of becoming infected with an STI (Lee et al., 2007; Lemon et al., 2002), more specifically HPV. Not only are these women at a general risk for contracting HPV through exposure to unprotected sex during the assault, previous research has shown that survivors of sexual assault often exhibit self-destructive behaviors, such as having multiple sexual partners and engaging in intercourse before knowing their partner's history, than non-survivors (Bohn & Holtz, 1996; Farley et al.,

2002; Lang et al., 2003; Miller, Monson, & Norton, 1995), thereby increasing their risk for contracting HPV or other STIs subsequent to the assault as well.

The hypothesis that survivors of sexual assault are more likely to contract cervical cancer due to an increased likelihood of exposure to HPV than non-survivors is a common one that has been supported through much research. However, there is a newer, alternative hypothesis that suggests that chronic or repeated sexual violence, as is common in assault survivors, is indirectly related to cervical cancer through a physiological response, which may suppress immune function and therefore reduce the body's ability to mount an effective response to HPV (Coker et al., 2000).

No matter the reason, survivors of sexual assault are at a greater risk of contracting cervical cancer than non-victims. Previous research has found violence history to be associated with the diagnosis of cervical cancer at advanced stages (Loxton et al., 2009; Modesitt, Gambrell, Cottrill, Hays, & Walker, 2006). This could be due to the fact that sexual assault survivors are likely to avoid routine cancer screenings. Therefore, by the time they see a doctor for symptoms they are experiencing, the cancer has reached an advanced stage that is no longer treatable. This reinforces the importance of determining the exact reasons that these women avoid screenings so that they may be encouraged to seek screening earlier.

1.4 PTSD and Screenings

Two of the factors that have been found to be associated with not having routine screenings are feelings of powerlessness and a fear of flashbacks to the abuse. These two factors are consistent with symptoms of PTSD, and this suggests that PTSD may be a

specific reason that survivors are less likely to have screenings. PTSD has actually been found to be associated with poor physical health. A study that examined survivors of sexual assault who had a diagnosis of PTSD found that the severity of PTSD predicted the self-reported physical symptoms above and beyond general life stressors and depression (Zoellner, Goodwin, & Foa, 2000). In another study, PTSD was found to mediate the relationship between a sexual assault history and abnormal pap smears (Lang et al., 2003). These findings suggest that PTSD impacts the health of those affected and thus may be a factor in why many assault survivors avoid screenings.

1.5 Locus of Control and Screenings

Locus of control (LOC) is a concept that refers to the degree to which an individual believes they have control over events occurring that have an influence on their life (Rotter, 1966). There are two types of LOC: internal and external. Having an internal LOC proposes that individuals believe these events are a direct result of their behavior, whereas having an external LOC proposes that these events are either under the control of others, or are due to chance (Rotter, 1966). There is some previous literature in which qualitative studies on cervical cancer screening were conducted with assault survivors, and comments made by some participants in these studies suggest that these women may have an external LOC (Ackerson, 2010; Ackerson, 2011). The comments centered on the idea that whether or not they had cancer was beyond their control so therefore, it was better not to be screened and find out (Ackerson, 2010; Ackerson, 2011). In a literature review of articles associated with the United Kingdom's cervical cancer screening program, it was found that women with a high health LOC, which is equivalent to an

internal LOC, were more likely to participate in the screening program (Fylan, 1998). This finding, combined with the comments of the participants in the qualitative studies, suggest that LOC may play a role as to whether or not a survivor of sexual assault has routine cervical cancer screenings. An internal LOC has been linked with preventative health behaviors such as reported seat belt use and preventative dental care (Porter & Long, 1999; Solomon, Mikulincer, & Avitzur, 1988; Wallston & Wallston, 1978). Forced sexual intercourse has been found to be significantly related to lower internal LOC (Miller et al., 1995) and individuals with an external LOC have been found to have more naïve beliefs about STIs and a causal, helpless attitude about how they are contracted (Wallston & Wallston, 1978). Finally, Bolstad & Zinbarg (1997), found that those who had experienced or were experiencing chronic, long-term abuse showed greater externality than those who were not. These findings suggest that women who have a history of sexual assault may be more likely to have a high external LOC and that an external LOC may lead an individual to be less proactive in regard to their health. In survivors of sexual assault, whose attitudes regarding their power to influence their health may be externally focused, this could mean that the external LOC they have may lead to the avoidance of cervical cancer screenings.

1.6 PTSD and Locus of Control

Since PTSD has been found to be associated with sexual victimization, it would be expected to be associated with LOC as well. In fact, PTSD symptoms have been found to be associated with an external LOC (Bolstad & Zinbarg, 1997). In a study of 2000 survivors of various terror attacks, a tendency toward an external LOC was found to

predict a diagnosis of PTSD, and these individuals with an external LOC had difficulty coping with the traumatic event (Gibrar, Plivazky, & Gil, 2010). Another study examined the relationship between sexual victimization, PTSD, and LOC. The study found that lessened perception of control was related to greater PTSD symptom severity following sexual victimization that involved force (Bolstad & Zinbarg, 1997). Also, women who had experienced childhood sexual abuse, they found that their general perception of control was diminished, meaning that these women have a more pronounced perceived lack of control within their lives (Bolstad & Zinbarg, 1997). These two studies show that PTSD and an external LOC are related to victimization. As a result, they may affect survivor's health behaviors, specifically, whether or not they have routine cervical cancer screenings.

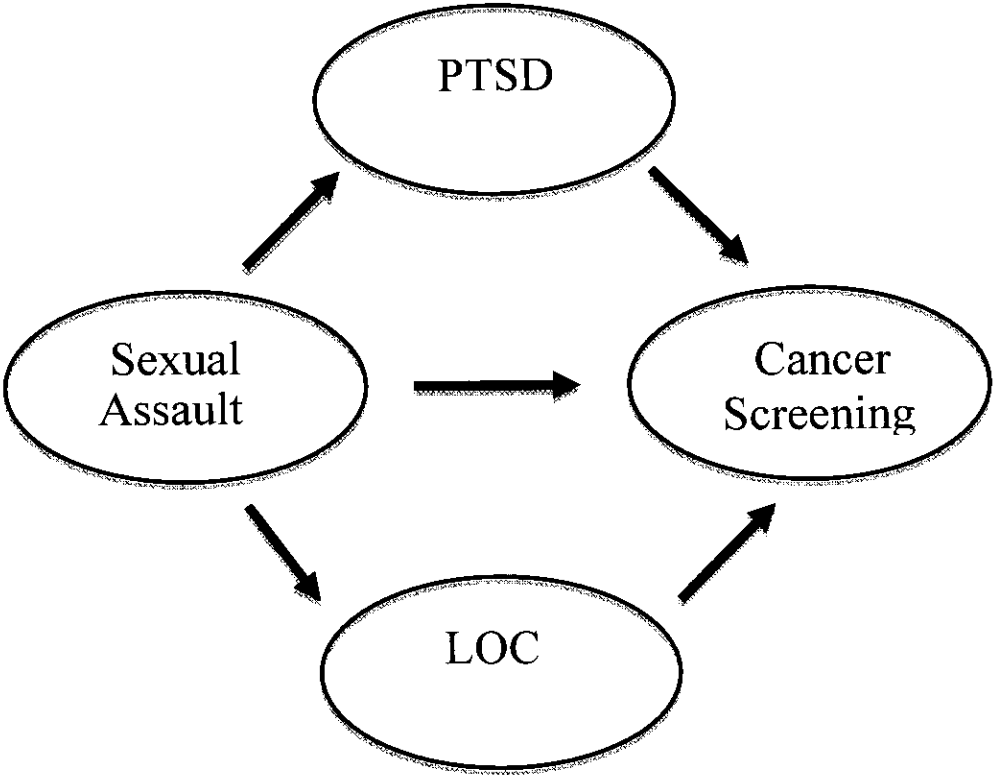
Although there has been previous research conducted that examined the relationships between health behaviors, PTSD, victimization, and LOC, there has been little to no research completed specifically on the relationship that LOC has with cervical cancer screenings. This is important to explore because LOC is something that could easily be addressed with survivors that would perhaps make them more likely to have routine pap smears and therefore place them at a lessened risk for cervical cancer. We aim to examine the relationship between sexual assault, LOC, PTSD, and cervical cancer screenings.

1.7 Hypotheses

In the present study, we will examine the relationship between sexual assault and LOC as well as test the following predictions: (a) there is a significant, positive

relationship between sexual assault and an external LOC; (b) LOC mediates the relationship between sexual assault and cervical cancer screenings; (c) PTSD mediates the relationship between sexual assault and cervical cancer screenings; and (d) individuals with PTSD are more likely to have an external LOC than those without. The conceptualization of the mediation relationships may be seen in figure 1.

Figure 1. Conceptualization of the predicted mediation relationships. This figure illustrates the hypothesized mediation effects of PTSD and LOC on sexual assault and cervical cancer screenings.



CHAPTER II

METHODS

2.1 Participants

Participants, 314 women, were recruited from undergraduate psychology courses at Cleveland State University and courses at Western Michigan University. Overall, ages of participants ranged from 18-69 with a mean age of 27 (SD = 10.38). The vast majority of participants listed their ethnicity as Caucasian (84.6%); however some participants reported their ethnicity as African American (10.3%), Hispanic (2.8%), Asian (2.1%), Other (1.5%), and Native American (.3%). The majority of participants had an individual income of less than \$10,000 (57.2%) and a household income between \$0 and \$40,000 (52.3%). Most participants were employed either full or part time (72.9%), affiliated with a university as a student or employee (96.2%), and had health insurance (86.4%).

2.2 Procedure

Participants completed an online survey via Survey Monkey that evaluated them on the variables: trauma history, PTSD symptoms, locus of control, and history of cervical cancer screenings. The survey took an average of 40-60 minutes to complete and participants were able to complete the survey at their convenience in a location of their choosing. Risks associated with the study were believed to be no greater than those of daily living. Participants had the right to withdraw at any time if they found questions to be too distressing or personal. Information for university counseling services was provided as well in case a participant was in need of immediate assistance. Participants from Cleveland State University were given the opportunity to be entered into a raffle for one of thirty \$10 gift cards to the campus bookstore.

2.3 Measures

Relevant demographic information was collected from individual participants including: age, ethnicity, income level, employment status, student status, and insurance status. Cervical cancer screening history was also assessed in the demographic section. Participants were asked, "How often do you obtain a pap smear test?" They were then able to choose from the following options: More than once a year; Every year; Every other year; Every three years; I do not get routine paps; or I've never had a pap.

Health Locus of Control

Constructed by Wallston, Wallston, & DeVellis (1978), the Multidimensional Health Locus of Control Scale (MHLC) is an 18 or 36 item, likert type, self-report measure designed to assess individual health locus of control beliefs including three

specific subscales measuring internality (IHLC), powerful others externality (PHLC), and chance externality (CHLC). There are two available forms of the measure for administration. The only difference between the two forms is the wording of questions and may be utilized separately or together. Alpha reliabilities for the MHLC were moderate, ranging from .673 to .767. For the purpose of this study, form A of this measure was administered. Seven month test-retest reliability was found to be acceptable for IHLC ($r = .58, p < .001$) and PHCL ($r = .76, p < .001$) but not for CHLC ($r = .10$) suggesting that CHLC is a state and not a trait measure (Winefield, 1982). Construct validity was found to be moderate when the subscales were compared to a measure of health status; IHLC was positively correlated ($r = .40$) and CHLC was negatively correlated ($r = -.28$)(Wallston, Wallston, & DeVellis, 1978). Since its publication, the MHLC has been used extensively.

Trauma History and PTSD

Developed to be a self-report measure of PTSD symptoms, the Posttraumatic Diagnostic Scale (PDS) measures the specific PTSD symptom groups: reexperiencing, avoidance, and arousal; as well as total symptom severity (Foa, Cashman, Jaycox, & Perry, 1997). Questions from the PDS were also used to assess participant's trauma history, including their sexual assault history. Participants were asked to complete a checklist of 12 traumatic events by indicating how many they have experienced or observed. The sexual assault screening question specifically asked, "Did anyone ever make you have sex by using force or threatening to harm you? This includes any type of unwanted sexual activity". Participants answered either "yes" or "no" and for analysis purposes, "yes" was coded as 0 and "no" was coded as 1. They were then asked which of

these events has bothered them most in the last month and refer to that event when answering the following questions. Finally, participants were asked a series of yes-no and likert-type questions measuring their feelings at the time of the event, their level of impairment, and which DSM-IV PTSD symptoms they are currently experiencing. The PDS measures the experience of PTSD symptoms on a continuum. A scale score is computed by summing participant's scores on the 17 questions assessing their experience of DSM-IV PTSD symptoms. The higher the score, the greater their symptom severity. Initial assessment of the psychometric properties of the PDS was done using a sample of 264 participants who had previously experienced or witnessed some kind of trauma. They reported strong internal consistency for total symptom severity ($\alpha = .92$), and high test-retest reliability for total symptom severity 2-3 weeks following initial administration ($r = .83$) (Foa et al., 1997).

2.4 Statistical Analysis

All statistical analyses were conducted using IBM SPSS Statistics 19 and INDIRECT, a bootstrapping macro for SPSS (Preacher & Hayes, 2008). Descriptive statistics including range, mean, and standard deviation for items included in the demographics section were initially computed. Secondly, correlations between the Multidimensional Health Locus of Control Scale (MHLC) and the Posttraumatic Diagnostic Scale (PDS) were computed in order to determine whether or not there was any relationship or collinearity between the variables. Bootstrapping analyses were conducted using INDIRECT in which the relationship between our measures of sexual assault, cervical cancer screening and the proposed mediators were examined. Using this

method, confidence intervals for the indirect effect were constructed and allowed us to determine if any meditational effect was present. Finally, logistic regression for the measures of sexual assault, cervical cancer screening, PTSD and MHLC was performed in order to determine their predictive value.

CHAPTER III

RESULTS

3.1 Final Sample

Four hundred sixty four participants initially took part in the study. However, 150 participants were eliminated either because they were under the age of 18 and therefore not eligible, they stopped answering questions halfway through the survey, or they provided patterned responses (e.g., they checked all 1s or 5s). Thus the final sample was 314, for a completion rate of 67.7% relative to all those who began the survey.

Descriptive statistics and correlations for study variables are displayed in table I. It was found that 20.3% of participants answered “yes” to having experienced sexual assault, 8.2% of participants do not have routine pap smears and 17.3% have never had a pap smear. During analyses, it was found that our dependent variable, cervical cancer screening history, had an abnormal distribution. Therefore, we dichotomized the variable by coding participants who have had a pap smear as 0 and those who have not as 1.

3.2 Hypothesis Testing

The first hypothesis, that there is a significant, positive relationship between sexual assault and an external LOC, was not supported (PHLC: $B = .030, p = .383$ and CHLC: $B = .009, p = .787$). The second and third hypotheses, that LOC and PTSD mediate the relationship between sexual assault and cervical cancer screenings, were not supported. The specific indirect effect through PHLC was .0136 with a bias corrected and accelerated 95% confidence interval (BCa 95% CI) of -.0304 to .1482; through CHLC was .0193 with a BCa 95% CI of -.0995 to .1852; and through PTSD was .0994 with a BCa 95% CI of -.3935 to .3612. The fourth hypothesis, that individuals with PTSD are more likely to have an external LOC than those without, was not supported (PHLC: $r = -.061, p = .281$ and CHLC: $r = .033, p = .555$).

3.3 Other Findings

Using INDIRECT (Preacher & Hayes, 2008), sexual assault was found to predict cervical cancer screenings. The total effects of sexual assault on screenings are .9885, $p < .05$ suggesting that survivors of sexual assault are less likely to have routine screenings. Sexual assault was also found to predict the experience of PTSD symptoms. The effects of sexual assault on the PDS are -9.9278, $p < .05$ suggesting that survivors are likely to experience PTSD symptoms. The CHLC was found to predict cervical cancer screenings. The effects of the CHLC on screenings are .1012, $p < .05$ suggesting that those who believe chance or fate is responsible for their health are less likely to have routine screenings. These results were confirmed using logistic regression. Sexual assault predicted cervical cancer screenings ($B = .815, p < .05$). Cox & Snell's R^2 of .013

and Nagelkerke's R^2 of .022 indicated a relatively poor explanation of the variance in screenings. Using the maximum chance criterion, 102.3% accuracy was needed to claim good predictive accuracy; the model only had 81.9%, indicating poor predictive accuracy. Sexual assault also predicted the experience of PTSD symptoms ($B = -.124, p < .05$). Cox and Snell's R^2 of .187 and Nagelkerke's R^2 of .281 indicated a moderate explanation of the variance in PTSD symptoms. Using the maximum chance criterion, 95.5% accuracy was needed to claim good predictive accuracy; the model only had 80.9%, no change from the null model. The CHLC predicted cervical cancer screenings ($B = .103, p < .05$). Cox and Snell's R^2 of .035 and Nagelkerke's R^2 of .059 indicated a relatively poor explanation of the variance in screenings. Using the maximum chance criterion, 104% accuracy was needed to claim good predictive accuracy; the model only had 83.4%, no change from the null model.

CHAPTER IV

DISCUSSION

4.1 Discussion of Findings

The present study investigated the relationship between sexual assault, PTSD, locus of control, and adherence to cervical cancer screening guidelines. Consistent with the findings of other studies (Loxton et al., 2009; Modesitt et al., 2006), the present study did find that if a woman has been sexually assaulted, she is less likely to have routine cervical cancer screenings. As previously discussed, this could be due to a multitude of reasons that include misinformation about the procedure, feelings of powerlessness, or that the screening causes flashbacks to the assault. The results also suggest that women who have been sexually assaulted are more likely to experience PTSD symptoms than those who have not. This too is consistent with previous findings that there are high prevalence rates of PTSD in survivors of sexual assault (Resnick et al., 1993). It should be mentioned, however, that although significant, the prediction accuracy of assault predicting the likelihood of developing PTSD symptoms was not greater than the null

model meaning that the predicting accuracy was very poor and no better than chance.

There are individual differences in the experience of and reaction to stress and what may be predictive of symptomology for some, may not be predictive for others. Some women may be more resilient which would allow them to recover from and process their assault more efficiently than others. Availability of resources could play a role in this as well. A woman who has strong familial and peer support may be able to utilize those relationships in order to process her assault; whereas a woman who does not have those types of relationships might not have access to social support that could help her recover from her assault. Availability of financial resources could also contribute because although therapy is available, it can be expensive and therefore those with the financial means are more likely to obtain the necessary treatment.

If a woman believes that chance, or fate, is responsible for her health then she is less likely to have routine cervical cancer screenings than women who believe that they are in control of their health. However, the prediction accuracy for this result was no better than chance implying that it is possible the belief in chance may be a state versus a trait and this was also suggested by Winefield (1982). It is possible that the belief in chance may be a temporary state that sometimes develops as a reaction to stress or new situations. For example, a woman may normally believe that she is in control of her health and participate in regular preventative health behaviors but if she was assaulted, she may develop a temporary belief that chance is responsible for what happened to her as a reaction to the stress and therefore choose not to have a cervical cancer screening as a result.

Contrary to our hypotheses, there was no relationship between sexual assault or PTSD and an external locus of control. As discussed previously, this could possibly be due to individual differences in the reaction to stress. Some survivors may develop an external locus of control as a result of feeling a loss of control from their assault however, other survivors may feel an intense need to be in control following their assault and as a result, develop an intense internal locus of control. Although PTSD and sexual assault were not found to significantly correlate with an external locus of control, it is possible that this is a result of an error in instrument selection. The MHLC is specifically directed at measuring the extent to which an individual believes that their health is or is not determined by their behavior (Wallston, Wallston, & DeVellis, 1978). For example, a woman with an internal health locus of control may choose to have routine cervical cancer screenings because she believes that preventative health care is the best way to avoid cervical cancer. A woman with a powerful others external health locus of control may choose to have routine cervical cancer screenings because her doctor, family, or other authority figures told her to do so. A woman with a chance external health locus of control may choose not to have routine cervical cancer screenings because she believes that her health is a result of chance or fate and nothing she does can change that. A more general locus of control measure would not only evaluate whether or not an individual holds internal or external beliefs about who or what is responsible for their health but it would evaluate them on their beliefs related to control over all aspects of their life. Therefore, if a more general locus of control measure had been utilized, perhaps a relationship between the variables would have emerged.

Inconsistent with previous studies, we found that there was no relationship between the experience of PTSD symptoms and cervical cancer screenings. Two reasons found that survivors of sexual assault do not have routine cervical cancer screenings are feelings of powerlessness (Ackerson, 2011; Leeners et al., 2007; Robohm & Bittenheim, 1996) and a fear of flashbacks to their abuse (Ackerson, 2010; Leeners et al., 2007; Seng, Sparbel, Low, & Killion, 2002; Weitlauf et al., 2010). Although these are two symptoms of PTSD, everyone who has PTSD does not experience them. It is likely that although some survivors with PTSD experience flashbacks to their abuse during a pap smear and thus avoid the procedure, other survivors with PTSD may not and therefore have no problems with having routine cervical cancer screenings.

Neither PTSD nor an external locus of control was found to mediate the relationship between sexual assault and cervical cancer screenings. As discussed throughout, it is possible that this is due to individual differences between survivors. Some survivors of sexual assault develop PTSD whereas others do not. Those who do develop PTSD may suffer from flashbacks to their abuse and therefore avoid cervical cancer screenings because they fear flashbacks and other survivors with PTSD do not suffer from flashbacks and are able to have routine cervical cancer screenings. Some survivors develop an external locus of control as a result of feeling powerless during their assault and other survivors develop a more intense internal locus of control in an attempt to regain control. These individual differences in experience and reaction make it difficult to predict consistent relationships between sexual assault, PTSD, locus of control, and cervical cancer screenings.

4.2 Limitations

The biggest limitation of the present study is the inability to understand causality. Although we measured participant's cervical cancer screening history, we did not ask whether or not they had a screening following sexual assault. Therefore, we had no way of knowing whether not having routine screenings was a result of sexual assault or if participants had chosen not to have routine screenings prior to being assaulted. Measuring which preceded the other would have allowed us to draw a more definitive conclusion as to whether sexual assault predicts routine screenings, or if there is another factor that should be investigated. Another major limitation of this study is that the sample was drawn from two universities from the same general geographic location and therefore participants were mostly young, Caucasian, and middle class. Future research should attempt to replicate the findings of the current study using a sample that is more diverse in terms of age, ethnicity, and socioeconomic status. Another limitation is that the MHLC was utilized and because it specifically focuses on LOC in regards to health and health behaviors, it is possible that important relationships were not found. Future research could use a more general LOC measure in combination with the MHLC in order to account for any LOC beliefs not related to health. Finally, the self-report nature of the survey introduces the possibility of bias due to socially desirable responding. A future study employing a multi-method design would strengthen the evidence for these relationships.

4.3 Future Research

This study initiates research on factors that may mediate the relationship between sexual assault and participation in cervical cancer screening programs. Future research may utilize a multi-method design that includes interviews, as well as a broader and more diverse sample. Future research may also investigate other factors and combinations of factors that may mediate the relationship between sexual assault and participation in routine screenings.

4.4 Clinical Implications

Survivors of sexual assault are at a serious risk for both psychological and physical complications following the assault. PTSD is highly prevalent in survivors and can impact their psychological health by forcing some of them to relive their trauma through flashbacks. It is also possible that some survivors may develop an external locus of control as a result of feeling powerless. Because of this, some survivors of sexual assault may avoid routine cervical cancer screenings. Unfortunately, survivors are at a high risk of contracting HPV and further, cervical cancer, which can be detected early through cervical cancer screenings. Hopefully the results of this study will help mental health professionals further understand the vast number of individual differences in the experiences of survivors of sexual assault and therefore treat each woman accordingly. For those survivors that do avoid routine cervical cancer screenings, therapists may make use of the results to educate them on the importance of routine screenings and help them regain feelings of control so that they may want to attend routine cervical cancer screenings.

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Table I
Means, Standard Deviations and Alphas of All Study Variables

Scale	1	2	3	4	5	6	7	8	9	M	SD	α
1. I. Income										2.09	1.63	
2. H. Income	.40**									3.95	1.99	
3. Age	.65**	.24**								18.10	10.38	
4. Assault	-.02	.10	-.20							1.78	.41	
5. Screening	-.23**	-.09	-.26**	.03						.18	.39	
6. PDS	-.06	-.16**	.06	-.48**	-.02					23.05	8.86	.94
7. IHLC	-.12*	-.06	-.08	.02	-.01	-.02				26.06	8.86	.63
8. PHLC	-.03	.05	-.13*	.05	.08	-.06	.03			17.21	4.05	.64
9. CHLC	-.12	-.02	-.20**	.02	.17**	.03	-.18**	.24**		16.76	4.31	.65

Note: I. Income, Individual Income; H. Income, Household Income; PDS, Posttraumatic Diagnostic Scale; IHLC, Internal Health Locus of Control; PHLC, Powerful Others Health Locus of Control; CHLC, Chance Locus of Control
*p<.05; **p<.01

Table II
Mediation of the Effect of Sexual Assault on Cervical Cancer Screening Through IHLC, PHLC, CHLC, and PTDS

	Point Estimate	Percentile 95% CI		BC 95% CI		BCa 95% CI	
		Lower	Upper	Lower	Upper	Lower	Upper
IHLC	.0060	-.0534	.0698	-.2070	.1007	-.0275	.1005
PHLC	.0136	-.0446	.1165	-.0298	.1496	-.0304	.1482
CHLC	.0193	-.1165	.1630	-.0990	.1888	-.0995	.1852
PTDS	.0994	-.3772	.6573	-.3758	.6626	-.3935	.6312
TOTAL	.1813	-.3556	.7300	-.3534	.7345	-.3774	.7007

Note. IHLC, Internal Health Locus of Control; PHLC, Powerful Others Locus of Control; CHLC, Chance Locus of Control; PTDS Posttraumatic Diagnostic Scale; BC, bias corrected; BCa, bias corrected and accelerated; 5,000 bootstrap samples