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Citation: Shepherd, Lee and Smith, Michael (2017) The Role of Fear in Predicting Sexually Transmitted Infection Screening. *Psychology & Health*, 32 (7). pp. 876-894. ISSN 0887-0446

Published by: Taylor & Francis

URL: <http://dx.doi.org/10.1080/08870446.2017.1307375>  
<<http://dx.doi.org/10.1080/08870446.2017.1307375>>

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# **The Role of Fear in Predicting Sexually Transmitted Infection Screening**

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Word count: 6,252

## The Role of Fear in Predicting Sexually Transmitted Infection Screening

**Objective:** This study assessed the extent to which social-cognitive factors (attitude, subjective norm and perceived control) and the fear of a positive test result predict sexually transmitted infection (STI) screening intentions and subsequent behaviour. **Design:** Study 1 (N = 85) used a longitudinal design to assess the factors that predict STI screening intention and future screening behaviour measured one month later at Time 2. Study 2 (N = 102) used an experimental design to determine whether the relationship between fear and screening varied depending on whether STI or HIV screening was being assessed both before and after controlling for social-cognitive factors. **Main Outcome Measures:** Across the studies the outcome measures were sexual health screening. **Results:** In both studies, the fear of having an STI positively predicted STI screening intention. In Study 1, fear, but not the social-cognitive factors, also predicted subsequent STI screening behaviour. In Study 2, the fear of having HIV did not predict HIV screening intention, but attitude negatively and response efficacy positively predicted screening intention. **Conclusion:** This study highlights the importance of considering the nature of the health condition when assessing the role of fear on health promotion.

Keywords: sexually transmitted infection; fear; HIV; screening

### Introduction

Undiagnosed sexually transmitted infections (STIs) are a growing problem. For example, in 2012 it was estimated that there were over 22,500 people in the UK who are unaware that they have HIV (<http://www.nat.org.uk/HIV-Facts/Statistics/Latest-UK-statistics/Undiagnosed-HIV.aspx>). The longer a person has an undiagnosed STI, the more likely they are to develop serious health problems. Moreover, these people may also unintentionally pass the infection on to others. Therefore, it is important that people are screened every time they engage in unprotected oral, vaginal or anal sex. However, people are often reluctant to seek testing for an STI, even if they have engaged in unprotected sex (e.g., Deblonde, De Koker, Hamers, Fontaine, Luchters, &

Temmerman, 2010; Flowers, Knussen, Li, & Church, 2003). Therefore, it is important to determine the factors which promote and deter STI testing. This research assessed the role of social-cognitive (attitude, subjective norm, perceived control) and emotional factors (fear of a positive test result) on sexual health screening.

### ***Social-Cognitive Predictors of Behaviour***

One of the most prominent social-cognitive models is the theory of planned behaviour (Ajzen, 1991). This model suggests behaviour is determined by people's attitude, their belief that significant others (e.g., friends and family) support the action (subjective norm), and their perceived control over undertaking the action (perceived control). Based on this model, people are likely to attend an STI screening appointment if they view screening as important, believe friends and family support screening and believe that they have control over whether or not they attend a screening appointment.

The predictive power of this model has been demonstrated across a variety of actions (Armitage & Conner, 2001; Godin & Kok, 1996). Importantly, factors within the theory of planned behaviour have been found to predict sexual health (Albarracin, Johnson, Fishbein, & Muellerleile, 2001; Sheeran & Taylor, 1999). Indeed, research has demonstrated that STI screening is associated with attitude (Mirkuzie, Sisay, Moland, & Astrøm, 2011), subjective norm (Westmaas, Kok, Vriens, Götz, Richardus, & Voeten, 2012) and perceived control (Adam, de Wit, Bourne, Knox, & Purchas, 2014). Therefore, it is important to consider the role of these social-cognitive factors on STI screening.

Although the theory of planned behaviour is well-supported, it has been argued that this theory could be improved by including other variables, such as emotional factors (Conner & Armitage, 1998; Sniehotta, Pesseau, & Araújo-Soares, 2014).

Indeed, numerous researchers have argued that behaviour is guided by both logical social-cognitive factors and emotional processes (Hofmann, Friese, & Wiers, 2011; Strack & Deutsch, 2004). As a result, it is important to understand the role that emotions may play in motivating people to attend an STI screening appointment. This is especially important given that previous research has found emotions and affective factors may be stronger predictors of some health behaviours than constructs in the theory of planned behaviour (e.g., Morgan, Stephenson, Harrison, Afifi, & Long, 2008; O'Carroll, Foster, McGeechan, Sandford, & Ferguson, 2011; Sandberg & Conner, 2009) and that including emotional factors into the theory of planned behaviour may improve the predictive power of the model (Sandberg & Conner, 2008).

### ***Fear and STI Screening***

Fear is one affective factor that has been associated with STI screening (Barth, Cook, Downs, Switzer, & Fischhoff, 2002; Deblonde et al., 2010). Indeed, numerous HIV campaigns in the 1980s and 1990s used fear to try to promote good sexual health (Ruiter, Abraham, & Kok, 2001). In general, fear is a negative emotion that is likely to be felt when one is believed to be threatened or needs to be protected (Roseman, Wiest, & Tamara, 1994; Smith & Lazarus, 1993). Being diagnosed with an STI may be damaging to one's wellbeing (Ciesla & Roberts, 2001; Hosek, Harper, & Domanico, 2000). Therefore, the threat posed by potentially receiving this diagnosis and the consequences of this may cause people to fear a positive test result (Flowers, Duncan, & Knussen, 2003).

Previous research has suggested that fear is likely to have mixed effects on behaviour (for reviews see Ruiter et al., 2001; Ruiter, Kessels, Peters, & Kok, 2014; van't Riet & Ruiter, 2013), with some studies suggesting the fear of a positive health screening result may promote beneficial health behaviours (Lovell, Wetherell, &

Shepherd, 2015) and others suggesting this fear can deter screening (Flowers et al., 2003; Flowers, Knussen, Li, & McDaid, 2012; Knussen, Flowers, & Church, 2004; Knussen, Flowers, & McDaid, 2014). The type of behaviour that is undertaken following feelings of fear is likely to depend on the perceived ability to cope with the threat (Lazarus & Folkman, 1984). Fear is likely to motivate people to engage in beneficial health behaviours when they believe that they can cope with the threat and defensive behaviours (e.g., avoidance, denial) when they feel unable to cope (for reviews, see Peters, Ruiter, & Kok, 2013; Witte & Allen, 2001). This suggests that the fear of a positive STI test result is likely to motivate people to be screened when they feel able to cope with having an STI ('If tests show I have an STI, it can easily be cured'). By contrast, this fear may produce defensive action when the person feels unable to cope with the condition ('If tests show I have an STI, there is nothing I can do about this').

To date, most fear research has focused on individual differences in people's perceived ability to cope with a specific health condition. For example, research has measured and manipulated the effect of differences in coping ability for lung cancer (Leventhal Watts, & Pagano, 1967), breast cancer (Rippetoe & Rogers, 1987), and AIDS (Witte, 1994). As such, variation in perceived coping ability *within* a health condition is likely to alter the effect of fear. However, there are also likely to be variations in perceived coping abilities *between* health conditions. For example, most STIs can be easily cured if they are caught at an early stage. Given this, people are likely to believe that they have a high ability to cope with a positive STI test result. Although HIV is an STI, focusing specifically on this condition rather than STIs in general may reduce the perceived ability to cope. This is because HIV is a treatable, but

not a curable condition. As such, people are likely to feel less able to cope with a positive HIV than STI test result.

This variation in coping is likely to alter the effects of fear. Fear of a positive test result is likely to promote health screening for conditions that are easily curable. By contrast, this fear may act as a barrier to health screening for conditions that are not curable. Based on this, fear of a positive test result should *promote* STI screening because most STIs are easily curable. On the other hand, this fear is likely to *deter* HIV screening because this condition is not curable. There is some research demonstrating that the fear of a positive HIV test result acts as a barrier to HIV screening (Flowers et al., 2003; Knussen et al., 2004; Knussen et al., 2014). However, research into the role of this fear in STI screening is somewhat limited. Indeed, research in this area has generally focused on condom use or has been specific to HIV screening (for reviews, see Earl & Albarracin, 2007; Sheeran, Abraham, & Orbell, 1999). There is little research assessing the extent to which a) fear promotes STI screening over and above the constructs in the theory of planned behaviour and b) the relationship between fear and screening varies depending on the type of condition (STI versus HIV). Therefore, across two studies we assessed whether the fear of having an STI promotes STI screening (Study 1) and whether the relationship between fear and screening varies depending on whether STI or HIV screening is under consideration (Study 2).

### **Study 1**

Study 1 assessed the role of fear in promoting STI screening and whether this fear predicted screening over and above the components of the theory of planned behaviour (Ajzen, 1991). Participants rated the theory of planned behaviour constructs (attitude, subjective norm and perceived control) and their fear of having an STI. We assessed whether this predicted their willingness to be screened (STI screening intention) and

whether they were screened within a month of completing the study (subsequent STI screening behaviour). Based on the research cited above, we hypothesised that STI screening would be predicted by the theory of planned behaviour constructs and that the fear of a positive test result would predict screening over and above these constructs. Finally, predicated by the notion that most STIs are curable, we hypothesized that the fear of a positive test result would positively predict screening attendance.

## ***Method***

### *Participants and Design*

This online study was conducted at a university in the North of England. Undergraduate participants were asked to complete this longitudinal online study in exchange for course credit. The only exclusion criterion was that the participant had to be single. This was included because it is common for people in a monogamous relationship to engage in unprotected sex without the concern of catching an STI (e.g., if both parties were virgins prior to the relationship or had previously been screened for an STI). A total of 116 participants started the first part of this online study. There were 12 participants who did not complete the first part of the study and were removed from the sample. A further 12 of the remaining participants were removed because these participants were believed to have completed the study more than once.<sup>1</sup> Finally, 7 participants were excluded because they indicated that they were either in a relationship or married. Therefore, the final sample consisted of 85 single participants (13 men and 72 women). The age range of these participants was 18-28 years ( $M_{\text{age}} = 19.54$ ,  $SD_{\text{age}} = 1.82$ ). Most participants were White ( $N = 79$ , 92.94%) and heterosexual ( $N = 74$ , 87.06%).

This study used a longitudinal design. The predictor variables were the theory of planned behaviour constructs (attitude, subjective norm and perceived control) and fear



of a positive test result. The outcome variables were STI screening intentions and subsequent STI screening behaviour.<sup>2</sup> Sexual health variables (i.e., number of sexual partners, past screening behaviour and protection use) were measured as covariates.

### *Materials and Procedure*

After giving consent, participants completed demographic measures (see above). Next, participants completed items relating to their past sexual health. The number of previous sexual partners was assessed using a single item: ‘How many sexual partners have you had in your lifetime?’ (1 = none, 2 = one, 3 = 2-5, 4 = 6-10, and 5 = more than 10).

Protection use for each type of sexual activity (vaginal, anal and oral sex) was measured using a single item for each activity. The vaginal and anal sex items were: ‘During vaginal/anal sex, how often do you use a condom?’ There are different forms of protection for oral sex (i.e., condom or dental dam). Therefore, the oral sex protection item was: ‘During oral sex, how often do you use protection’ All three items were rated on a 6-point scale (1 = I have never had sex, 2 = never, 3 = rarely, 4 = sometimes, 5 = most of the time, and 6 = always). Past screening behaviour was assessed using a single item: ‘Have you ever been tested for an STI?’ (yes versus no). We also used a single item to measure whether the participant was up-to-date with their screening: ‘Have you been tested for an STI since you last engaged in unprotected oral, vaginal or anal sex?’ (response options = yes, no or I have not engaged in unprotected sex).

Participants were then asked to complete the social-cognitive and affective items. All items were rated on a 7-point Likert scale (1 = *strongly disagree* and 7 = *strongly agree*). People’s intentions to get tested for an STI was assessed using two items: ‘I will definitely get tested for STIs in the next month’ and ‘I am going to get tested for STIs in the next month’ ( $r = .81, p < .001$ ). Two items measured fear: ‘I am afraid that the test may find that I have an STI’ and ‘I fear the test finding that I have an

STI' ( $r = .72, p < .001$ ). Two items measured attitudes 'STI tests are beneficial' and 'STI tests are positive' ( $r = .72, p < .001$ ). Subjective norm was measured using the following items: 'Most people who are important to me think that STI testing is important' and 'Most people who are important to me think that STI testing is beneficial' ( $r = .80, p < .001$ ). Perceived control was assessed using the following items: 'It is easy to get tested for an STI' and 'I could easily get tested for an STI' ( $r = .87, p < .001$ ).

Approximately 1 month later all participants received a second questionnaire via email. This questionnaire asked participants 'Have you been tested for a sexually transmitted infection (STI) within the last month' (yes versus no). We also asked participants to provide us with the name of the street where they grew up, the name of their first pet, the day of the month they were born, the house number of their current address, the subjects they studied at A-level, and the name of their first school. These questions were asked at Time 1 and Time 2 to allow us to link this data in an anonymous way.

### *Statistical Analysis*

We first assessed overall sexual health (i.e., number of sexual partners, protection use and past testing), demonstrated Time 2 response rate and screened the data. Next, a linear multiple regression was conducted to determine whether the theory of planned behaviour constructs and fear of having an STI predicted intention to be screened. A binary logistic regression was used to assess whether these factors also predicted subsequent screening behaviour. In both analyses, the theory of planned behaviour constructs were entered into the model in Step 1, fear was entered into the model in Step 2 and the covariates (i.e., sexual health variables) were entered into the model in Step 3.

## **Results**

*Sexual health.* People were most likely to have between 2-5 sexual partners (N = 40, 47.06%). Most participants had engaged in vaginal sex (N = 77, 90.59%). Of these participants, the mode response for condom use during vaginal sex was ‘most of the time’ (20, 25.97%). Most of the sample had not engaged in anal sex (N = 65, 76.47%). For the participants who had engaged in anal sex the mode response for condom use was ‘always’ (N = 9, .45.00%). Most participants had engaged in oral sex (N = 80, 94.12%). The majority of these participants (N = 71, 88.75%) never used protection (condom or dental dam) during oral sex. Further analyses indicated that three participants had not engaged in oral, vaginal or anal sex. Given that STI screening was not relevant to these participants, they were excluded prior to further analyses. Of the remaining 82 participants, 29 (35.37%) had never been tested for an STI. This level of screening is comparable with other research in this area (e.g., Flowers et al., 2003; Shepherd & Harwood, 2016). Moreover, 56 (68.29%) had not been tested since they had last engaged in unprotected oral, vaginal or anal sex.

*Time 2 response rate.* At Time 2, 76 participants started the study. We removed data for 2 participants who did not complete the Time 2 measure, 3 participants who completed the Time 2 questionnaire twice, 3 participants who had completed the Time 1 questionnaire more than once, 4 participants who were either in a relationship or married, 1 participant whose Time 2 data could not be accurately matched to their Time 1 data and 3 participants who had not engaged in oral, anal or vaginal sex. This left a total of 60 of the 82 participants (73.17%) who had completed the Time 2 questionnaire. Thirteen of these participants (21.67%) had been screened for an STI within the last month.

*Data screening.* A logarithmic transformation was performed on the perceived

control and square-root transformations were performed on the attitude and subjective norm variables, prior to further analysis, to correct for outliers. In line with previous research (Shepherd & Harwood, 2016), we calculated a single protection use (condom or dental dam) variable using the vaginal, anal and oral sex items. To calculate this, we first recoded these variables (1 = *Never* and 5 = *Always*). We then calculated the mean protection use scores for the sexual activities that the participant had undertaken. For example, if the participant had not engaged in anal sex, the score was based on the mean of the vaginal and oral sex variables.

### *STI Testing Intentions and Behaviour*

We assessed whether the theory of planned behaviour constructs (attitude, subjective norm and perceived control), the fear of having an STI, and the sexual health variables were associated with STI testing intention and subsequent testing behaviour (Table 1). Correlation analyses revealed a significant positive relationship between the fear of having an STI and STI testing intention. Importantly, the fear of having a STI was also positively related to STI testing behaviour. STI testing intention was also positively associated with the number of sexual partners and past testing behaviour. STI screening behaviour was also positively associated with STI screening intention.

Next, we conducted regression analyses to determine whether the fear of having an STI uniquely predicted STI screening intention and behaviour. First, we conducted a linear multiple regression on STI screening intention, with the theory of planned behaviour constructs entered into the model in Step 1, fear in Step 2, and sexual health variables in Step 3. The  $R^2$  for Step 1 was .04,  $F(3, 78) = 1.18$ ,  $p = .325$ . In the model none of the theory of planned behaviour variables significantly predicted STI testing intention (Table 2). The  $R^2$  for Step 2 was .23,  $F(4, 77) = 5.81$ ,  $p < .001$ . Importantly, adding the fear of having an STI significantly increased the predictive power of the

model,  $\Delta R^2 = .19$ ,  $F(1, 77) = 18.91$ ,  $p < .001$ . In this step, fear was a significant positive predictor of STI screening intention (see Table 2). By contrast, STI screening intention was not predicted by attitude, subjective norm, or perceived control. The  $R^2$  for Step 3 was  $.29$ ,  $F(7, 74) = 4.35$ ,  $p < .001$ . Including the sexual health covariates did not significantly improve the model,  $\Delta R^2 = .06$ ,  $F(3, 74) = 2.08$ ,  $p = .110$ . In the model STI testing intention was positively predicted by fear and the number of sexual partners. These results reflect the fact that the fear of having an STI was more likely to predict STI screening intention than the theory of planned behaviour variables and that this relationship remains even after controlling for sexual health.

A logistic regression was also performed to determine the unique predictive power of the social-cognitive factors and fear on future screening behaviour. This analysis was restricted to the 60 participants who had completed the Time 2 measure. In line with the linear regression, the theory of planned behaviour constructs were entered in Step 1, fear in Step 2 and the sexual health covariates in Step 3. The pseudo- $R^2$  for Step 1 was  $.06$  (Nagelkerke, 1991;  $\chi^2(3) = 2.55$ ,  $p = .467$ ). STI screening behaviour was not predicted by attitude, subjective norm or perceived control (see Table 3). Importantly, adding fear significantly increased the predictive power of the model (pseudo- $R^2 = .20$ ,  $\chi^2(1) = 5.81$ ,  $p = .016$  for step,  $\chi^2(4) = 8.36$ ,  $p = .079$  for model). In Step 2 the fear of having an STI positively predicted STI screening behaviour (Table 3). By contrast, STI screening behaviour was not predicted by attitude, subjective norm or perceived control. Finally, adding the sexual health covariates did not significantly improve the model (pseudo- $R^2 = .33$ ,  $\chi^2(3) = 6.40$ ,  $p = .094$  for step,  $\chi^2(7) = 14.76$ ,  $p = .039$  for model). In this model fear was the only significant predictor of subsequent STI testing behaviour. These results reflect the fact that the fear of having an STI was more

likely to promote STI screening behaviour than the theory of planned behaviour constructs and sexual health variables.

### ***Discussion***

This research assessed the role of fearing having an STI and theory of planned behaviour constructs on STI screening intentions and behaviour. This fear positively predicted people's intention to attend an STI screening appointment and subsequent STI screening behaviour. These results reflect the fact that the fear of having an STI is likely to promote STI screening. Interestingly, the theory of planned behaviour constructs did not predict STI screening intention or behaviour. As mentioned above, research has demonstrated that some health behaviours are more likely to be predicted by emotional than social-cognitive factors (Morgan et al., 2008; O'Carroll et al., 2011; Sandberg & Conner, 2009). In line with this, Study 1 suggests the emotional aspects of STI screening may be more likely to predict screening than social-cognitive factors.

Previous research has demonstrated that fear of having HIV is likely to act as a barrier to HIV screening (Flowers et al., 2003, 2012). As mentioned above, given that most STIs are easily curable, people may feel more able to cope with this. As a result, the fear of having an STI may *promote* STI screening. By contrast, given that HIV is a treatable but not a curable condition, people may feel less able to cope with this. As a result, the fear of having HIV may *deter* HIV screening. This was tested in Study 2.

### **Study 2**

The aim of Study 2 was to determine whether the relationship between fear and screening varied depending on whether the target object was STIs or HIV. In this study half the participants were asked about their fear towards having an STI and STI screening, while the other half were asked about their fear towards having HIV and HIV

screening. We hypothesized that fear would positively predict screening when discussing STIs and negatively predict screening when discussing HIV. Although this study focused on fear, it was also important to ensure the effects were not due to the theory of planned behaviour constructs or sexual health. Therefore, these variables were measured as covariates. Moreover, it has been suggested that fear appeals are most effective when the behaviour is viewed as effective (Ruiter et al., 2001; Witte & Allen, 2000). Therefore, we also measured the extent to which sexual health screening was regarded as an effective strategy for maintaining good sexual health (i.e., response efficacy). This was entered into the analyses as a covariate.

## ***Method***

### *Participants and Design*

Participants were recruited through a course credit system at a university in the North of England. To take part in this online study participants had to be 18 years or older, single and have engaged in oral, anal and/or vaginal sex. A total of 160 participants started this study. One participant withdrew from the online study and was thus removed from the sample. A further 52 participants were removed because they were in a relationship and thus not eligible to take part in this research. Data from three participants were removed because they had completed the study more than once. Finally, three participants were removed because they were virgins. Therefore, the final sample consisted of 101 participants (17 men and 84 women). Participants were aged between 18-37 years ( $M = 19.96$ ,  $SD = 3.06$ ). Participants were most likely to be White ( $N = 95$ , 94.06%) and heterosexual ( $N = 90$ , 89.11%).

A between participants design was used. The independent variable was the fear of having an STI/HIV. The moderating variable was whether participants completed a

questionnaire assessing their thoughts about STI *or* HIV testing. The dependent variables were screening intention and future screening behaviour. The covariates were attitude, subjective norm, perceived control, past sexual health and response efficacy.

### *Materials and Procedure*

Participants were informed that the study was investigating their thoughts about sexual health screening. Participants in the STI screening condition were informed that the study was investigating their thoughts about STI screening. By contrast, in the HIV screening condition participants were told that the study was investigating their thoughts about HIV screening. We then assessed past screening behaviour by asking participants whether they had previously been screened for STI/HIV (depending on condition). This was followed by the fear, social-cognitive and intention items. The fear, attitude, subjective norm, and perceived control items were identical to Study 1 in the STI condition. By contrast, in the HIV condition ‘STI’ was replaced with ‘HIV’ In line with Study 1, there was a strong correlation between the two items measuring fear ( $r = .87, p < .001$ ), attitude ( $r = .65, p < .001$ ), subjective norm ( $r = .86, p < .001$ ), and perceived control ( $r = .89, p < .001$ ), suggesting these scales were reliable. The intention items were ‘I will definitely get tested for STIs/HIV’ and ‘I am going to get tested for STIs/HIV’ ( $r = .85, p < .001$ ). The response efficacy items were: ‘STI/HIV screening is an effective way to maintain good health’ and ‘STI/HIV screening is an effective way to reduce the threat of diseases’ ( $r = .62, p < .001$ ). In line with the other measures, the intention and response efficacy items stated ‘STI’ in the STI condition and ‘HIV’ in the HIV condition.

Next, we measured future STI/HIV screening behaviour. Participants were informed if they wanted to be screened for an STI/HIV then they could click on a



hyperlink to find the details of their local screening centre. As a behavioural measure we assessed whether or not the participant clicked on this link.

### *Statistical Analysis*

Initially, we assessed general sexual health and screen the data. Next, we used a series of ANOVAs to assess the effect of condition on the variables. Following this, we used correlation analyses to look at the association between the variables. We then conducted our primary analysis, testing whether the health condition (STI versus HIV) moderated the relationship between fear of finding a positive result and sexual health screening. This was tested using the Process Macro (Model 1, Hayes, 2013). In this analysis fear was a continuous independent variable, screening was the dependent variable and condition was a dichotomous moderating variable (STI versus HIV). The independent and moderating variables were mean-centred. We also repeated this analysis with the social cognitive factors and sexual health entered into the model as covariates to ensure that the effects were due to fear.

### **Results**

*Sexual health.* Participants were most likely to have between 2-5 sexual partners (N = 42, 41.58%). Most participants had engaged in vaginal sex (N = 93, 92.08%). Of these participants, the mode response for condom use was 'sometimes' for vaginal sex (N = 27, 29.03%). Most participants had not engaged in anal sex (N = 66, 65.35%). Of the participants who had engaged in anal sex, the mode response for condom use was 'never' (N = 16, 45.71%). Most participants had engaged in oral sex (N = 97, 96.04%). The mode response for protection use during oral sex was 'never' (N = 89, 91.75%). All participants had engaged in either vaginal, anal or oral sex. The majority of participants had not previously been screened for sexual health conditions (N = 59, 58.42%). Moreover, the majority of participants had not been tested since they last engaged in

unprotected sex (N =75, 74.26%). For our behavioural measure, only 1 person (0.99%) clicked on the link to find the details for their local screening centre. As a result, it was not possible to conduct analyses on this variable. Therefore, our hypotheses were tested using the screening intention variable.

*Data screening.* Logarithmic transformations were applied to the attitude and perceived control variables to correct for outliers. In line with previous research (Shepherd & Harwood, 2016) and Study 1, a single protection use variable was computed by calculating the average protection use during oral, anal and vaginal sex.

#### *Effect of Condition and Correlations between Variables*

The ANOVA results revealed that fear, subjective norm, perceived control, response efficacy and screening intention were higher in the STI than the HIV condition (Table 4). By contrast, attitude towards screening did not differ between the STI and HIV screening condition. Furthermore, correlation analyses revealed that fear was not significantly associated with any of the social-cognitive factors, past screening behaviour or protection use (Table 5). However, it was positively associated with the number of sexual partners. Screening intention was positively associated with fear, subjective norm, perceived control, response efficacy, the number of sexual partners and past behaviour. By contrast, attitude did not predict screening intention.

#### *Moderating Role of Condition*

Next, we tested whether the relationship between fear and screening varied based on the type of health condition (STI versus HIV). Therefore, we tested whether the type of health condition moderated the relationship between fear and screening. The ANOVA results demonstrated a significant effect of condition on fear. Therefore, the moderation analysis consisted on a conditional indirect effect in which condition both predicted fear and moderated the relationship of fear to screening intentions (see Hayes,

2013). There was a main effect of condition and fear (Table 6, Analysis 1).

Importantly, the interaction of condition and fear was significant, indicating the presence of moderation.

Further analysis revealed that for STI screening, fear of a positive result positively predicted screening intention ( $B = 0.48$ ,  $SE = 0.12$ ,  $p < .001$ ; see Figure 1). By contrast, for HIV screening fear was a non-significant predictor of screening intention ( $B = 0.14$ ,  $SE = 0.12$ ,  $p = .232$ ). These results reflect the fact that fear of having an STI promotes STI screening, while fear of having HIV did not predict HIV screening.

We also repeated this analysis controlling for the social-cognitive and sexual health variables. Importantly, the interaction effect remained significant after entering these covariates into the model (Table 6, Analysis 2). In this model, attitude negative predicted screening intention, while response efficacy and past screening behaviour positively predicted screening intention.

### ***Discussion***

Study 2 replicated the findings of Study 1 by demonstrating that the fear of a positive result positively predicts STI screening intention. Importantly this study enhances Study 1 by demonstrating that the relationship between fear of a positive result and sexual health screening varies depending on the type of screening. For STIs, the fear of a positive result positively predicted screening. By contrast, we found a non-significant relationship between this fear and HIV screening. Although previous research has found a negative relationship between *the fear of a positive result* and HIV screening (e.g., Flowers et al., 2003; Knussen et al., 2004), the use of a smaller, undergraduate sample in the current study may have reduced the likelihood of replicating this negative relationship.

In this study we assessed sexual health screening behaviour by measuring whether participants clicked on a link to find their local screening centre. However, only one participant clicked on this link. There are likely to be a variety of reasons why the vast majority of participants did not use this link. This may reflect a low intention to be screened. However, there may also be other factors that deterred the use of this link that do not relate to the participant's willingness to undertake the behaviour, such as already knowing the location of their local screening centre and feeling self-conscious about visiting sexual health webpages.

## **General Discussion**

Previous research in this area has suggested that the fear of having HIV deters HIV screening (Flowers et al., 2003, 2012; Knussen et al., 2004). We enhanced this research by demonstrating that the effect of fear is likely to vary depending on the sexual health condition. Across two studies, we found that the fear of having a STI predicted STI screening intentions and behaviour. By contrast, Study 2 did not find a relationship between the fear of having HIV and HIV screening. Therefore, whereas previous research has focused on the role of social cognitive variables in moderating the effects of fear (for reviews, see Ruiter et al., 2001, 2014), we suggest it is also important to consider the health condition.

Previous research has demonstrated the efficacy of the theory of planned behaviour in health (Armitage & Conner, 2001; Godin & Kok, 1996). However, across both studies, we found that subjective norm and perceived control did not predict sexual health screening. Attitude negatively predicted screening. This theory has been criticised for not including emotional factors (Conner & Armitage, 1998; Sniehotta et al., 2014). Indeed, research suggests that some health behaviours are more likely to be predicted by emotional than social-cognitive factors (Morgan et al., 2008; O'Carroll et

al., 2011; Sandberg & Conner, 2009). Based on the current research, we argue that sexual health screening is more likely to be predicted by the emotional factor of fear than social-cognitive factors. Moreover, these findings also have implications for the health psychology literature. Although there is a growing body of literature in health psychology assessing the role of emotions on health behaviours (e.g., Morgan et al., 2008; Lovell et al., 2015; Shepherd, Watt, & Lovell, 2016), research on the role of emotions on health behaviours is limited. Therefore, further work is needed in this area.

There are numerous positive aspects to this research. First, it assessed both screening intention and future screening behaviour. Moreover, the use of the longitudinal design provided support for a directional relationship from the fear of having an STI to STI screening (i.e., fear predicts STI screening rather than vice-versa). That said, it is also worth considering its limitations for this research. First, the study was conducted on an undergraduate population. Education reduces the likelihood of people using emotion or avoidance-based coping strategies (Matud, 2004). In highly educated samples (such as the present study) fear may be likely to promote STI screening. Therefore, further research is needed in samples with a more representative level of education. Second, the fear variable was measured rather than manipulated, preventing the researchers from inferring causality. Although experimental research has demonstrated the causal effect of fear (for a review, see Ruiter et al., 2014), further research is needed to determine a causal relationship from the fear of having an STI to screening. Finally, based on previous research (Flowers et al., 2003; Knussen et al., 2004, 2014), we focused on the fear of a positive test result. However, there are other negative emotions that relate to testing, such as the fear of dying and worries relating to disclosure of one's results and being subjected to discrimination based on one's results (for a review, see Deblonde et al., 2010). Similarly, the stress of waiting for the results

is also likely to deter testing (Hutchinson, Corbie-Smith, Thomas, Mohanan, & del Rio, 2004). Therefore, further research is needed to assess how these factors predict STI and HIV screening.

Despite these limitations, it is important to consider the implications of this research. Numerous researchers have debated the effectiveness of fear appeals (Earl & Albarracin, 2007; Ruiter et al., 2001; Witte & Allen, 2000). This research suggests that fear appeals are likely to be more effective in promoting STI screening, but unlikely to promote HIV screening. In fact, previous research would suggest that this fear may have a detrimental effect on HIV screening (Flowers et al., 2003; Knussen et al., 2004). As such, fear appeals are likely to be effective in sexual health campaigns, provided that the campaigns focus on STIs in general rather than specifically on HIV. However, further research is needed to test the effectiveness of such campaigns. Indeed, it is important for future research to conduct randomised controlled trials to ensure that such interventions are likely to be effective.

This research focused on the emotions experienced prior to testing. It is also important to consider the emotional responses after people have received their screening results. The removal of a threat is likely to elicit relief (Roseman, 1984). Therefore, people are likely to feel relief if they receive a negative screening result as the threat of having a harmful condition has been removed. By contrast, receiving a positive screening result provides knowledge of one's sexual health condition, but does not eradicate the threat. Instead, the individual has to confront the condition and the potential threats that this poses. Therefore, STI screening results are only likely to attenuate fear in people with a negative test result.

In conclusion, this research assessed the role of fear in promoting STI screening. The fear of having an STI positively predicted STI screening intentions and future

screening behaviour. By contrast, the fear of having HIV did not predict HIV screening. This demonstrates the importance of considering the health condition. Moreover, it suggests that the exact nature of the fear-eliciting object (e.g., HIV versus general STI screening) needs to be considered when designing health campaigns.

## Footnotes

- 1 The data indicated that 6 participants had taken part in the study twice. Therefore, the data for all 12 duplicate cases (i.e., 6 people completing the study twice) were removed prior to further analysis.
- 2 In order to address a further research question, this study also assessed the effect of an anticipated regret intervention on STI screening. This intervention did not have a significant effect on the variables and is therefore not discussed further. STI stigma, the emotions associated with STI stigma (e.g., shame, embarrassment, disgust) and moral norm were also measured in both studies. However, these variables were not included in the analyses because they did not significantly predict the dependent variables in either study.

## Disclosure Statement

No conflicts of interest

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Table 1. Descriptive statistics and intercorrelations between variables (Study 1).

	<i>M (SD)</i>	1	2	3	4	5	6	7	8	9
1) Attitude	2.25 (0.43)	-								
2) Subjective norm	2.12 (0.39)	.38***	-							
3) Perceived control	1.57 (0.22)	.39***	.47***	-						
4) Fear	2.60 (1.63)	-.02	.13	.09	-					
5) No. sexual partners	3.12 (0.97)	.31**	.26*	.21	.24*	-				
6) Protection use	2.28 (0.94)	-.004	.02	.13	.004	.09	-			
7) Past testing	-	-.20	.24*	.28*	.31**	.38***	-.09	-		
8) STI testing intention	3.49 (1.89)	-.01	.19	.07	.46***	.33**	-.07	.27*	-	
9) STI testing behaviour	-	-.12	.09	.08	.33*	.23	-.17	.13	.33**	-

\* =  $p < .05$ , \*\* =  $p < .01$ , and \*\*\* =  $p < .001$ . Prior to the transformations the means for the theory of planned behaviour variables were 5.85 (SD = 1.40) for attitude, 5.51 (SD = 1.26) for subjective norm and 5.84 (SD = 1.13) for perceived control. Past testing coded 0 = no and 1 = yes. STI testing behaviour coded as 0 = no and 1 = yes. Correlations between dichotomous and categorical variables are point biserial correlations. Correlation between two dichotomous variables (i.e., past testing and subsequent STI testing behaviour) are Phi coefficients.

Table 2. Regression analyses for STI screening intention (Study 1).

	Step1		Step 2		Step 3	
	B (SE)	$\beta$	B (SE)	$\beta$	B (SE)	$\beta$
Attitude	-0.40 (0.55)	-.09	-0.22 (0.49)	-.05	-0.54 (0.50)	-.12
Subjective norm	1.09 (0.63)	.22	0.81 (0.57)	.17	0.64 (0.56)	.13
Perceived control	0.01 (1.14)	.001	-0.25 (1.03)	-.03	-0.28 (1.03)	-.03
Fear	-	-	0.51 (0.12)	.44***	0.43 (0.12)	.37**
No. sexual partners	-	-	-	-	0.45 (0.22)	.23*
Protection used	-	-	-	-	-0.17 (0.20)	-.09
Past testing	-	-	-	-	-0.23 (0.45)	-.06
$R^2$	.04		.23***		.29***	
$\Delta R^2$			.19***		.06	

\* =  $p < .05$ , \*\* =  $p < .01$ , and \*\*\* =  $p < .001$ .

Table 3. Logistic regression analyses for subsequent STI testing behaviour (Study 1).

	Step 1		Step 2		Step 3	
	B (SE)	Odds ratio (Lower, upper CI <sub>95</sub> )	B (SE)	Odds ratio (Lower, upper CI <sub>95</sub> )	B (SE)	Odds ratio (Lower, upper CI <sub>95</sub> )
Attitude	-1.11 (0.80)	0.33 (0.07, 1.59)	-0.98 (0.83)	0.38 (0.07, 1.91)	-1.64 (1.05)	0.19 (0.03, 1.51)
Subjective norm	0.57 (0.99)	1.77 (0.25, 12.31)	0.58 (1.05)	1.79 (0.23, 13.94)	0.11 (1.21)	1.12 (0.11, 11.88)
Perceived control	1.41 (1.90)	4.11 (0.10, 170.98)	1.17 (1.90)	3.21 (0.08, 133.51)	2.60 (2.24)	13.39 (0.17, 1076.89)
Fear	-	-	0.52* (0.22)	1.67 (1.08, 2.59)	0.53* (0.26)	1.69 (1.01, 2.84)
No. sexual partners			-	-	0.76 (0.45)	2.14 (0.90, 5.12)
Protection use			-	-	-0.82 (0.50)	0.44 (0.16, 1.18)
Past testing			-	-	-0.40 (0.94)	0.67 (0.11, 4.20)
Nagelkerke Pseudo-R <sup>2</sup>		.06		.20		.34
Model $\chi^2$		2.55		8.36		14.76*
Step $\chi^2$				5.81*		6.40

\* =  $p < .05$ , \*\* =  $p < .01$ , and \*\*\* =  $p < .001$ .

Table 4. Effect of condition (STI versus HIV) on fear, social-cognitive variables and screening intention (Study 2).

	HIV <i>M</i> ( <i>SD</i> )	STI <i>M</i> ( <i>SD</i> )	F-value
Fear	2.58 (1.88)	3.53 (1.98)	$F(1, 99) = 6.20, p = .014, \eta_p^2 = .06$
Attitude	5.86 (1.00)	6.07 (1.28)	$F(1, 99) = 0.88, p = .350, \eta_p^2 = .01$
Subjective norm	5.06 (1.14)	5.61 (1.18)	$F(1, 99) = 5.82, p = .018, \eta_p^2 = .06$
Perceived control	5.19 (1.28)	5.96 (1.13)	$F(1, 99) = 10.22, p = .002, \eta_p^2 = .09$
Response efficacy	5.49 (0.98)	5.99 (0.96)	$F(1, 99) = 6.61, p = .012, \eta_p^2 = .06$
Screening intention	3.94 (1.78)	5.10 (1.70)	$F(1, 99) = 11.13, p = .001, \eta_p^2 = .10$



Table 5. Descriptive statistics and correlation analyses (Study 2).

	<i>M</i> ( <i>SD</i> )	1	2	3	4	5	6	7	8	9	10
1) Condition	-	-									
2) Fear	3.03 (1.98)	.24*	-								
3) Attitude	1.60 (0.22)	.16	.06	-							
4) Subjective norm	5.32 (1.19)	.24*	.01	.49***	-						
5) Perceived control	1.52 (0.23)	.35***	.15	.44***	.51***	-					
6) Response efficacy	5.73 (1.00)	.25*	.18	.41***	.48***	.47***	-				
7) No. sexual partners	3.15 (1.05)	.13	.26**	.30**	.19	.27**	.26**	-			
8) Protection use	2.12 (0.87)	-.06	.04	-.03	-.05	-.11	-.19	.06	-		
9) Past screening behaviour	-	.40***	.19	.19	.31**	.36***	.28**	.30**	-.01	-	
10) Screening intention	4.50 (1.83)	.32**	.39***	.13	.34***	.28**	.52***	.35***	.06	.47***	-

*Note.* \* =  $p < .05$ , \*\* =  $p < .01$  and  $p < .001$ . Prior to the transformations the means were 5.96 (SD = 1.15) for attitude and 5.55 (SD = 1.26) for perceived control. Past testing coded 0 = no and 1 = yes. STI testing behaviour coded as 0 = no and 1 = yes. Correlations between dichotomous and categorical variables are point-biserial correlations. Correlation between two dichotomous variables (i.e., past testing and subsequent STI testing behaviour) are Phi coefficients.

Table 6. Moderating role of condition on the relationship between fear and screening intention (Study 2).

	Analysis 1	Analysis 2
	B (SE)	B (SE)
Condition	0.85* (0.33)	0.26 (0.30)
Fear	0.30** (0.08)	0.22** (0.07)
Condition X fear	0.34* (0.17)	0.32* (0.14)
Attitude	-	-1.62* (0.73)
Subjective norm	-	0.25 (0.14)
Perceived control	-	-1.04 (0.75)
Response efficacy	-	0.76*** (0.16)
Number of sexual partners	-	0.21 (0.14)
Protection use	-	0.26 (0.16)
Past screening behaviour	-	1.03*** (0.31)

Note. \* =  $p < .05$ , \*\* =  $p < .01$  and \*\*\* =  $p < .001$ .

Figure 1

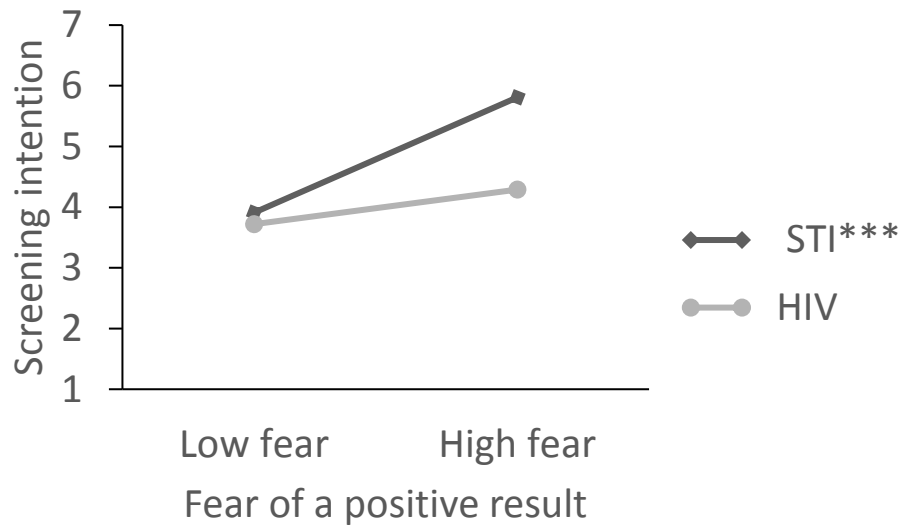


Figure 1. Moderating role of screening type (STI versus HIV) on the relationship between fear of a positive result and screening intention (Study 2). \*\*\* =  $p < .001$ , STI = STI screening condition, HIV = HIV screening condition.