Predicting uptake of a routine cervical smear test: A comparison of the health belief model and the theory of planned behaviour

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PREDICTING UPTAKE OF A ROUTINE CERVICAL SMEAR TEST: A COMPARISON OF THE HEALTH BELIEF MODEL AND THE THEORY OF PLANNED BEHAVIOUR

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This paper reports on a study carried out to identify predictors of uptake of cervical screening among 142 women (59% response rate) in inner London. Two social cognition models were used: The Health Belief Model (HBM; Becker, 1974) and the Theory of Planned Behaviour (TPB; Ajzen, 1991) and in addition anticipated affect following non-attendance for screening was assessed. The TPB emerged as by far the superior model for predicting screening intentions, explaining 51% of the variance in comparison with only 4% explained by the HBM variables. However, neither model was able to predict a significant amount of variance in uptake of screening three months later. Possible reasons for the poor prediction of this type of behaviour are discussed.

KEY WORDS: Health belief model, theory of planned behaviour, screening.

INTRODUCTION

Among countries in the European Community, the UK has the second highest incidence rate of invasive cervical cancer (Esteve, Kricker, Ferlay and Parkin, 1993). The detection of the pre-cursors of this cancer by use of a cervical smear test is the aim of a national UK screening programme, and understanding the factors that influence uptake of this type of screening is of vital importance. It is of particular interest to examine the predictors of adherence to screening programmes over time, as it is believed that it is repeated attendance which will ultimately lead to the reduction of mortality from this cancer (International Agency for Research on Cancer, IARC, 1986).

This paper describes a prospective study of uptake of cervical screening among a population of inner London women. In the present study, the decision to undergo screening is examined using two social cognition models; the Health Belief Model (Becker, 1974; Becker and Rosenstock, 1987) and the Theory of Planned Behaviour (Ajzen, 1991). These theoretical frameworks are briefly outlined below.

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Social Cognition Models

(a) The Health Belief Model. The Health Belief Model (HBM) is the most widely used model of health behaviour. It has been applied in a number of contexts including use of preventive screening, obtaining immunisations, compliance with medical regimens and response to illness symptoms (see Sheeran and Abraham, 1996, for a review; Harrison, Mullen and Green, 1992, for a meta-analysis). The HBM in its original form includes four main components: perceived susceptibility to, and perceived severity of, a disease; and perceived benefits and perceived costs of a preventive health action. Numerous different versions of the HBM appear in the literature (e.g., some include a measure of self efficacy). In the present study a traditional version of the model using only the core constructs is employed, but the model is extended to include a measure of intention. Research suggests that the prediction of behaviour is improved when intention is included in the HBM (e.g., Quine, Rutter and Arnold, 1998). Intention may act as a mediator variable between the HBM variables and behaviour. This has been suggested previously by, amongst others, Calnan (1984) in relation to uptake of breast screening and King (1982) in relation to high blood pressure screening.

(b) Theory of Planned Behaviour. The Theory of Planned Behaviour (TPB) is an extension of the Theory of Reasoned Action (TRA; Fishbein and Ajzen, 1975). It has been widely applied to a variety of behaviours – both health and non-health related (see Conner and Sparks, 1996, for a review and meta-analyses by Godin and Kok, 1996, and Sheppard, Hartwick and Warshaw, 1988). The TPB postulates that the proximal determinant of a behaviour is an intention to perform it. In turn, intentions are determined by three constructs: attitude towards the behaviour, subjective norm, and perceived behavioural control (PBC). Attitude toward the behaviour refers to the person's overall evaluation of the behaviour, which may be positive or negative. Subjective norms involve perceptions of how other people think the individual should behave in relation to the particular behaviour in question (injunctive social norm). PBC refers to perceptions of personal control over carrying out the behaviour and also to perceptions of ease or difficulty in performing the behaviour.

Recently it has been suggested that the subjective norm construct could be extended to include measures of perceptions of how other people themselves behave – descriptive social norm (Cialdini, Kallgren and Reno, 1991). Arguably, though, the efficacy of this extension depends on the behaviour in question as some behaviours are less visible than others; having a smear test is a “private” behaviour. Both types of norms are explored in the present study with an expectation that injunctive norms will be more important than descriptive norms. Regarding PBC, Ajzen (1991) uses control to mean both internal and external constraints. However, it certainly seems possible that these may not be the same and therefore would not form one construct (see Terry and O’Leary, 1995). Internal constraints seem closer to perceptions of self efficacy (Bandura, 1977) and to perceived costs of the behaviour which may affect the formation of intentions, whereas external constraints are perhaps more likely to reflect factors that may prevent a person from translating their intention into action. The possibility that the constructs are distinct, and that internal constraints may be more influential for screening intentions and behaviour, is explored in this paper.

A criticism of social cognition models which has been particularly applied to the TPB is that they are unable to explain behaviour which may be under affective control as they do
not adequately take into account emotional factors in decision making. Individuals may be motivated to attend for screening to avoid feeling regret at not doing so since attending for a smear test is a behaviour which may lead to “bad news” (i.e., abnormal smear test result) or “good news” (i.e., normal smear test result). Consistent with this is the finding that efforts to encourage attendance for screening are more successful if women are given loss-framed messages – emphasising the risks of not having the screening – than gain-framed messages – emphasising the benefits of screening (Banks, Salovey, Greener and Rothman, 1995). The concept of anticipated affect stems from regret theory (Bell, 1981; Loomes and Sugden, 1982) and research suggests that it can be an important predictor of intentions in addition to attitudes to behaviour (e.g., van der Pligt, Zeelenberg, van Dijk, de Vries and Richard, 1998). The role of anticipated affect in predicting intentions to undergo a smear test and possibly to predict later behaviour has yet to be examined and is therefore investigated in this study as an extension to the TPB.

As can be seen from the above descriptions of these models, there is some overlap in the components they include. This has been noted amongst others by Sutton (1987) and Weinstein (1993). Both have their theoretical basis in expectancy-value theory and are phrased in terms of the perceived consequences of action. Personal abilities to carry out a behaviour are explicitly included in the TPB (i.e., PBC) and arguably can be represented in the HBM in the costs element. The major differences between the models are that intentions and social norms are not included in the HBM as predictors of behaviour and the TPB does not include a measure of perceived threat of disease. Also the rules for combining constructs in the TPB are explicit, whereas there is no consensus regarding how the HBM constructs should be combined, if at all. A major aim of the present study was to establish whether a health specific model (i.e., the HBM) will be superior in terms of its ability to predict intentions and behaviour in this behavioural domain to a more general model (i.e., TPB). It has been argued that “it is uneconomical to entertain specific theories of health behaviour... unless the predictive success of these specific models is greater than that of general models” (Stroebe and Stroebe, 1995).

A number of studies have, in fact, compared the performance of models and attempted to combine constructs from these to achieve the best explanation of behaviour (e.g., Conner and Norman, 1994; Mullen, Hersey and Iverson, 1987; Oliver and Berger, 1979; Quine et al., 1998; Ronis and Kaiser, 1989). However, in the domain of cancer screening uptake, none of these studies included a measure of behaviour (Hennig and Knowles, 1990; Hill, Gardner and Rassaby, 1985; Seydel, Taal and Weigman, 1990; Seibold and Roper, 1979).

Uptake of cervical screening would seem to be a behaviour which readily lends itself to study with the application of decision making models. It is likely that owing to its non-habitual and infrequent nature individuals would make a decision each time about whether or not to be screened. In addition, participation in screening is voluntary; it is ultimately the individual’s choice as to whether or not she attends for a test. However, meta-analyses of applications of social cognition models to the prediction of intentions and behaviour have shown that screening behaviour is especially poorly predicted (e.g., Godin and Kok, 1996; Harrison et al., 1992). It should be noted, however, that the category of screening behaviour used by both Godin and Kok (1996) and Harrison et al. (1992) was very broad, including self examination behaviours, seeking medical care for symptoms, having mammograms, and asymptomatic check-ups for venereal disease. It has been pointed out that screening itself is not an homogeneous behaviour (e.g., Marteau, 1993) and that different types of screening may be predicted by different beliefs.
A review by Orbell and Sheeran (1993) identifies a number of factors which may be associated with cervical screening attendance. However, very few studies on the uptake of cervical screening have based their research design or the interpretation of their findings on a social cognition model, and neither meta-analysis mentioned above included a study of uptake of cervical screening. Exceptions include Hill et al. (1985); Hennig and Knowles (1990); Mandleblatt, Traxler, Lakin, Kanetsky, Kao and Harlem Study Team (1992); Mandleblatt, Traxler, Lakin, Kanetsky and Kao (1993); Murray and McMillan (1993); Orbell, Crombie and Johnston (1996); Orbell and Sheeran (1998); and Seibold and Roper (1979). Some of these studies found that elements of the TPB and the HBM can predict intentions to be screened and past behaviour (e.g., Hennig and Knowles, 1990; Hill et al., 1985; Mandleblatt et al., 1992; Orbell et al., 1996). The TPB has not, thus far, been applied to uptake of cervical screening and therefore the influence of perceived behavioural control on screening intentions and behaviour remains to be examined. Predictors of actual uptake of cervical screening have been under-researched; with the exception of Orbell and Sheeran (1998) most of the studies in this area have been cross sectional surveys with self reports of past behaviour. Such studies assume that the beliefs pre-dated the behaviour that they are supposed to predict. In fact, taking part in screening could, in itself, alter an individual’s opinions of that behaviour, particularly if the behaviour is new to the individual. The current study, by contrast, used a prospective design to predict actual uptake of cervical screening. This allows more confident conclusions to be drawn concerning the relationship between cognitions and behaviour.

In summary, the aims of this study were: firstly, to identify the best predictors of intentions and uptake of a routine cervical smear test using the HBM and the TPB; secondly, to compare the ability of the two models to do this; and thirdly, to examine the role of anticipated negative emotion in predicting screening intentions and behaviour.

METHODS

Participants

The women who participated in the study were selected from two general practices in south-east London. Criteria for inclusion in the study were that the women were due to be asked to attend for a routine cervical smear test in the six weeks following their contact by the researchers.

A total of 283 questionnaires were sent to women identified on GP lists as being due for screening, together with an explanatory covering letter signed by a female GP and a free-post return envelope. Forty-two women were not eligible for the study, having left their address. Thus, 241 questionnaires were sent to eligible women. One hundred and forty two questionnaires were completed before the women would have been sent an invitation letter to attend for screening. Two questionnaires were completed too late and were therefore not included. The response rate was 58.9% (142/241).

The mean age of the women was 38.1 years (sd = 11.6). Most of the women (56%) were from social classes I or II [classified according to their current or previous occupation]. Eighty-three per cent of the women described themselves as white.

1 Although this percentage is quite high, representing 14.8% of the questionnaires sent, it transpired that the names of number of students who had been living in a hall of residence three years earlier when they registered with the general practice were included on the list. These women had all left the address and the questionnaires sent to them were returned by the Royal Mail.
Measures

The measures included in the study questionnaire were developed from a pilot study and elicitation interview (see Bish, 1997, for details). Some HBM items were also adapted from a widely used reliable questionnaire developed by Champion (1984). TPB items were designed in accordance with the principle of correspondence (Fishbein and Ajzen, 1975; Ajzen and Timko, 1986), i.e. they were all phrased specifically as referring to attending for a smear test in the next three months to match the measure of behaviour. HBM items were not written in this way in order that new items would match those adapted from the previously used questionnaire (Champion, 1984). Correspondence of measures is not a requirement of the HBM and this issue is explored further in the discussion of this paper.

The components of the TPB and the HBM, and the measure of anticipated affect were assessed with multiple items which were summed to form scales. Most items used five-point bipolar scales with the exception of those used to assess PBC and anticipated affect which used four-point unipolar scales. The items were assessed for internal consistency using Cronbach’s \( \alpha \). Only direct measures of attitude, subjective norm and PBC were assessed in the questionnaire to avoid the repetition of items which would have been covered by the items designed to measure HBM constructs (see Table 1 for items, Cronbach \( \alpha \) and scoring details).

Table 1 Questionnaire items used to measure constructs from the Health Belief Model and the Theory of Planned Behaviour, including Cronbach \( \alpha \)

<table>
<thead>
<tr>
<th>Intention (( \alpha = 0.86 ))</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>If given the chance, do you intend to attend for a smear test in the next three months? (no definitely not-yes definitely)</td>
<td></td>
</tr>
<tr>
<td>How likely is it that you will attend for a smear test in the next three months if given the chance? (extremely likely-extremely unlikely).</td>
<td></td>
</tr>
</tbody>
</table>

Health Belief Model (strongly agree–strongly disagree) \( R = \) reversed item

Perceived susceptibility (\( \alpha = 0.79 \))
- My physical health makes it likely that I will get cervical cancer
- My lifestyle makes it likely that I will get cervical cancer
- I believe that my chances of getting cervical cancer are high
- My chances of getting cervical cancer are small (R)
- I do not see myself getting cervical cancer in the next year (R)
- With my family history I am unlikely to get cervical cancer (R)
- There is a good possibility that I will get cervical cancer
- I worry a lot about getting cervical cancer
- I do not think that I am the sort of woman who would get cervical cancer

Perceived severity (\( \alpha = 0.61 \))
- Getting cervical cancer would interfere with my sex life
- If I got cervical cancer I would have problems which would last a long time
- If I got cervical cancer my whole life would change
- My feelings about myself would not change if I got cervical cancer (R)
- Getting cervical cancer would not be a problem for me (R)

Perceived benefits (\( \alpha = 0.71 \))
- There is nothing I can do to detect cervical cancer (R)
- I believe that a smear test will only find evidence of cervical cancer when it is too late to treat it (R)
- Cervical smear tests can detect abnormal changes before I would notice any symptoms
- If I have regular smear tests cervical cancer will be found before it is advanced
- Having a smear test would not give me peace of mind (R)
- Having regular smear tests is not a good idea (R)
- I have a lot to gain by having regular smear tests
Table 1 (Continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Response Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would be reassured about cervical cancer if I had smear tests regularly</td>
<td>Cervical smear tests are no good at detecting cervical cancer in its early stages (R)</td>
</tr>
</tbody>
</table>

**Perceived costs** ($\alpha = 0.78$)

- I am very afraid of having a smear test
- Having a smear test is too inconvenient for me
- I am flustered whenever I have a smear test
- Getting a smear test does not interfere with my other activities (R)
- Getting a smear test is time consuming
- I don’t mind giving up my time to have a smear test (R)
- I am rarely embarrassed when I have a smear test (R)
- I find that smear tests are painful
- The way a smear test is performed causes me distress
- I am never made to feel uncomfortable when having a smear test (R)

**Theory of Planned Behaviour**

**Attitude** ($\alpha = 0.85$)

Attending for a smear test in the next three months if given the chance would be: (5 items, extremely important, harmful, foolish, safe, good–extremely unimportant, beneficial, wise, unsafe, bad).

**Injunctive subjective norm** ($\alpha = 0.87$)

- Most people who are important to me would think I should attend for a smear test in the next three months if I am given the chance *(strongly agree–strongly disagree)*.
- Most people who are important to me would approve of me attending for a smear test in the next three months if I am given the chance *(strongly agree–strongly disagree)*.

**Descriptive subjective norm**

Most women who are important to me attend for smear tests *(strongly agree–strongly disagree)*.

**Self efficacy** ($\alpha = 0.66$)

How difficult would it be for you to attend for a smear test in the next three months if given the chance? (4 point scale, extremely difficult–not at all difficult)

- If you were given the chance, how confident are you that you could attend for a smear test in the next three months? (4-point scale, not at all confident–extremely confident)

**Perceived Behavioural Control**

How much control do you feel you have over whether or not you attend for a smear test in the next three months if given the chance? (4-point scale, no control–complete control)

**Anticipated affect** ($\alpha = 0.89$)

How would you feel if you did not attend for a smear test in the next three months when given the chance? (4-items, 4-point scales, extremely tense, guilty, worried, regretful–not at all tense, guilty, worried, regretful)

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*(a) Intentions.* The women’s intention to be screened was assessed with two items.

*(b) HBM.* Nine items measured perceived susceptibility to cervical cancer and five measured perceptions of its severity. Nine items measured the perceived benefits of cervical screening and ten measured perceptions of its costs.

*(c) TPB.* Five semantic differentials were used to provide a direct measure of attitude towards attending for a smear test in the next three months. Three items assessed subjective norms, two injunctive and one descriptive. It was found, as expected, that including the descriptive norm item reduced the reliability of the scale (from $\alpha = 0.87$ to $\alpha = 0.74$). It was therefore treated separately in the analysis. Three items assessed PBC. The items included measures of perceived control over attending for a test (external constraint), perceived difficulty and perceived confidence (internal constraints). A reliability analysis revealed that the item for external control reduced the reliability of the scale (from $\alpha = 0.66$ to $\alpha = 0.59$)
and was therefore not combined with the two items measuring the ease and confidence with which a woman perceived she could attend for a smear test (i.e., self efficacy concepts). Subsequent analyses treat these variables separately.

(d) Anticipated affect. A measure of anticipated affect was derived from four items assessing how women anticipated they would feel if they did not attend for a smear test when invited to do so.

(e) Past behaviour. Women were asked whether they had ever had a smear test and this information was cross checked with GP records.

Screening Attendance

Computerised GP records were checked to establish whether or not the women attended for a smear test at their own GP surgery or elsewhere in the three months following completion of their questionnaire.

RESULTS

Screening Intentions and Attendance

Only women who had ever had a smear test were included in the following analyses (n=133) as there is evidence to suggest that predictors of first time and subsequent behaviour may be different (e.g., Marteau, 1993; Norman and Conner, 1996). Only nine women had never been screened representing too small a group to be used in a separate analysis to explore predictors of first time attendance for screening.

One hundred and fourteen women (85.7%) reported that they would probably or definitely attend for a smear test (scores of 2 to 4 on the intention scale – formed by summing the two intention items to give a possible range of scores of -4 to 4), 13 women (9.8%) reported they would probably or definitely not attend for a test (scores of -2 to -4) and six women were unsure (score of zero). Within three months of completing their questionnaire, 69 women (51.9%) had attended for a smear test and 64 (48.1%) had not.

Univariate Predictors of Intentions and Behaviour

Table 2 shows the means and standard deviations for the social cognition variables measured in this study. Pearson’s product moment correlation coefficients were calculated to explore the associations of the social cognition variables with intentions and behaviour and these are also reported in Table 2. Variables derived from the TPB tended to have the strongest relationships with reported intentions, in particular attitude towards the behaviour (r=0.67) and injunctive subjective norms (r=0.54). In contrast, descriptive subjective norms were not correlated with intentions. Whilst perceptions of control over attending for screening were not correlated with intentions, the self efficacy measure was. Descriptive subjective norms and perceived behavioural control did not significantly increase the variance explained by the models in the following multivariate analyses and are therefore not considered further. Variables derived from the HBM were less strongly related to intentions and in the case of perceptions of the severity of cervical cancer no significant correlation...
Table 2  Mean scores for the social cognition variables and Pearson's correlations among these and with intentions and behaviour

<table>
<thead>
<tr>
<th>Scale</th>
<th>Mean (sd)</th>
<th>Behaviour</th>
<th>Intention</th>
<th>Susceptibility</th>
<th>Severity</th>
<th>Benefits</th>
<th>Costs</th>
<th>Attitude</th>
<th>Injunctive subjective norm</th>
<th>Descriptive subjective norm</th>
<th>Self efficacy</th>
<th>Perceived control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention</td>
<td>2.5 (2.3)</td>
<td>0.17</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Susceptibility</td>
<td>23.7 (5.6)</td>
<td>-0.02</td>
<td>0.28**</td>
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<td></td>
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<td></td>
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<tr>
<td>Severity</td>
<td>17.3 (3.4)</td>
<td>-0.01</td>
<td>-0.13</td>
<td>-0.27**</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benefits</td>
<td>38.6 (4.4)</td>
<td>0.15</td>
<td>0.18*</td>
<td>0.12</td>
<td>-0.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Costs</td>
<td>21.6 (6.3)</td>
<td>-0.12</td>
<td>-0.19**</td>
<td>0.02</td>
<td>0.25**</td>
<td>-0.50***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td>1.4 (0.6)*</td>
<td>0.22**</td>
<td>0.67***</td>
<td>0.27**</td>
<td>-0.21*</td>
<td>0.37***</td>
<td>-0.35***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injunctive subjective norm</td>
<td>2.6 (1.6)</td>
<td>0.11</td>
<td>0.54***</td>
<td>0.27**</td>
<td>-0.07</td>
<td>0.24*</td>
<td>-0.18</td>
<td>0.71***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Descriptive subjective norm</td>
<td>1.0 (0.7)</td>
<td>0.03</td>
<td>0.08</td>
<td>0.29**</td>
<td>-0.15</td>
<td>0.26*</td>
<td>-0.08</td>
<td>0.24*</td>
<td>0.34**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self efficacy</td>
<td>6.8 (1.3)</td>
<td>0.09</td>
<td>0.49***</td>
<td>-0.05</td>
<td>-0.06</td>
<td>0.41***</td>
<td>-0.43***</td>
<td>0.30**</td>
<td>0.19</td>
<td>0.24*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived control</td>
<td>3.4 (0.8)</td>
<td>0.09</td>
<td>0.13</td>
<td>-0.07</td>
<td>-0.12</td>
<td>0.28**</td>
<td>-0.34***</td>
<td>0.28**</td>
<td>0.14</td>
<td>0.14</td>
<td>0.32**</td>
<td></td>
</tr>
<tr>
<td>Anticipated affect</td>
<td>9.5 (3.6)</td>
<td>0.18</td>
<td>0.46***</td>
<td>0.38***</td>
<td>-0.15</td>
<td>0.28**</td>
<td>-0.20*</td>
<td>0.67***</td>
<td>0.63***</td>
<td>0.36***</td>
<td>0.18</td>
<td>0.21*</td>
</tr>
</tbody>
</table>

* Since there was some missing data on this variable a mean score was calculated and used in further analyses.

*p < 0.05; **p < 0.01; ***p < 0.001. Two-tailed significance levels.
was found. For behaviour, the strongest and only significant correlation was observed for attitude towards screening \( (r = 0.22) \). The correlation between intentions and behaviour was only marginally significant \( (r = 0.17, p = 0.057) \). None of the HBM variables were found to be significantly correlated with later behaviour.

**Multivariate Analyses of Predictors of Intentions and Behaviour**

A series of hierarchical multiple regressions was carried out to identify the best predictors of intentions and uptake of cervical screening and to compare the ability of the theoretical models to explain these. Data from a subset of participants \( (n=96) \) who had no missing data on any of the variables were used in these analyses. For comparability with the analyses of prediction of intentions, linear regression was used to analyse predictors of behaviour. However, since the behaviour measure was dichotomous (i.e., attendance/non-attendance) the results were checked using logistic regression analysis. The results obtained were the same in both types of analyses. Table 2 shows a correlation matrix of the modelled variables.

(a) **HBM based analyses.** In the first analysis (see Table 3), intentions were regressed onto the four HBM variables. A non-significant proportion of the variance was explained \( (F = 2.11; R^2 = 0.08, \text{adjusted } R^2 = 0.04) \). Perceived susceptibility was the only belief that significantly contributed to the variance explained \( (\beta = 0.25, p < 0.05) \), indicating that those women who feel susceptible to cervical cancer are more likely to intend to attend for a smear test.

In the next analysis (see Table 4, step 1) behaviour was regressed onto the HBM variables. A non-significant proportion of the variance was explained \( (F = 0.45; R^2 = 0.02, \text{adjusted } R^2 = -0.02) \) and no variable significantly contributed to the variance. Adding intention to the HBM variables (see step 2) was expected to increase the variance explained in behaviour. However, again, a non-significant proportion of the variance was explained by the variables \( (F = 0.69; R^2 = 0.04, \text{adjusted } R^2 = -0.02) \), the change in \( R^2 \) was not significant, and no individual variable made a significant contribution to the variance.

(b) **TPB based analyses.** Firstly (see Table 5, step 1), intentions were regressed onto the TPB variables. The results of this analysis showed that attitudes towards screening were predictive of intentions \( (\beta = 0.60, p < 0.001) \) and a significant proportion of variance was explained. \( (F = 34.02; R^2 = 0.53, \text{adjusted } R^2 = 0.51; p < 0.001) \). Neither injunctive norm nor self efficacy made a significant contribution to the variance explained. Secondly (see Table

<table>
<thead>
<tr>
<th>Variable</th>
<th>( \beta )</th>
<th>( R^2 )</th>
<th>Adjusted ( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefits</td>
<td>0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costs</td>
<td>-0.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Susceptibility</td>
<td>0.25*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severity</td>
<td>0.01</td>
<td>0.08</td>
<td>0.04</td>
</tr>
</tbody>
</table>

\* \( p < 0.05 \).

\*The original \( -2 \text{ log likelihood} \) of the constant only model was 132.91. The HBM variables reduced this to 129.26, a non-significant reduction \( (\chi^2 = 3.66 (5), \text{ns.}) \). No variables were significant and 59% of women were correctly classified. The TPB variables reduced the \( -2 \text{ log likelihood} \) to 127.31, a non-significant reduction \( (\chi^2 = 5.61 (4), \text{ns.}) \). No variables were significant and 59% of women were correctly classified.
5, step 2) anticipated affect was added. The equation was significant ($F=25.20; R^2=0.53$, adjusted $R^2=0.51; p<0.001$) but there was no significant change in $R^2$. As in step 1, an independent predictive effect on intentions was obtained for attitude towards the behaviour ($\beta=0.60, p<0.0001$) showing that controlling for affect in the equation did not modify the effect of attitude on intentions. Anticipated affect had no significant independent effect.

### Table 4  Results of the multiple regression analysis using HBM variables and intentions to predict behaviour

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>$\beta$</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>Change in $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Benefits</td>
<td>0.09</td>
<td>0.06</td>
<td>-0.01</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>Costs</td>
<td>-0.06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Susceptibility</td>
<td>-0.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severity</td>
<td>-0.01</td>
<td>0.02</td>
<td>-0.02</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Benefits</td>
<td>0.09</td>
<td>0.04</td>
<td>-0.02</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>Costs</td>
<td>-0.04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Susceptibility</td>
<td>-0.04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severity</td>
<td>-0.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intention</td>
<td>0.14</td>
<td>0.04</td>
<td>-0.02</td>
<td></td>
</tr>
</tbody>
</table>

### Table 5  Results of the multiple regression analysis using TPB variables and anticipated affect to predict intentions

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>$\beta$</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>Change in $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Attitude</td>
<td>0.60*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Injunctive Norm</td>
<td>0.13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Self efficacy</td>
<td>0.07</td>
<td>0.53*</td>
<td>0.51</td>
<td>n/a</td>
</tr>
<tr>
<td>2</td>
<td>Attitude</td>
<td>0.60*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Injunctive Norm</td>
<td>0.13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Self efficacy</td>
<td>0.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Affect</td>
<td>0.01</td>
<td>0.53*</td>
<td>0.51</td>
<td>0.00</td>
</tr>
</tbody>
</table>

* $p<0.001$.  

### Table 6  Results of the multiple regression analysis using TPB variables and anticipated affect to predict behaviour

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable</th>
<th>$\beta$</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>Change in $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Intention</td>
<td>0.15</td>
<td>0.03</td>
<td>0.01</td>
<td>n/a</td>
</tr>
<tr>
<td>2</td>
<td>Intention</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attitude</td>
<td>0.21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Injunctive Norm</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Self efficacy</td>
<td>-0.13</td>
<td>0.06</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>3</td>
<td>Intention</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attitude</td>
<td>0.22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Injunctive Norm</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Self efficacy</td>
<td>-0.13</td>
<td>0.06</td>
<td>0.01</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Affect</td>
<td>-0.01</td>
<td>0.06</td>
<td>0.01</td>
<td></td>
</tr>
</tbody>
</table>
Comparison of Social Cognition Models

The study highlights that whether or not a measure of intention is included in the HBM, the ability of the model to predict behaviour is as good – or bad – as that of the TPB in that neither model was able to account for a significant proportion of variance in behaviour. However the study also shows that for the prediction of intentions the TPB explained considerably more variance in intentions than the HBM – 51% of the variance in comparison to 4%. Therefore despite criticisms of the TPB for lacking emotional content, for example in a measure of perceived threat, it was found that this model performed better than the health specific HBM in predicting screening intentions.

In contrast to this study’s findings, the few studies which have compared the HBM with the TRA (none have compared the HBM with the TPB for uptake of cancer screening) have found that variables derived from the HBM are able to account for more variance in intentions to have a smear test (e.g., Hennig and Knowles, 1990; Hill et al., 1985). It is therefore debatable whether the better prediction of intentions from the TPB in the current study results from conceptual differences between the theories or differences in the way the model components were operationalised. On a conceptual level, the study provides evidence that although the TPB is not specifically designed to predict health behaviour, whereas the HBM is, its components predict more variance in intentions. Equally, the study shows that direct measures of attitudes are better at predicting intentions than the more detailed belief based measures used in the HBM. It could therefore be argued, as others have, that the TPB is a more economical model (e.g., Quine et al., 1998).

On a methodological level, however, the results show that specific measures are effective for predicting specific intentions to carry out a behaviour, and the poorer prediction from the HBM in the current study may be due to the non-specific measures used rather than to the type of components it contains. An alternative explanation of the present findings then may be that the poorer prediction of intention afforded by the HBM variables could be attributable to the lack of correspondence between measures of its components and the measure of intention. This has implications for how the HBM should be measured as its application rarely follows the principle of correspondence (Ajzen and Timko, 1986). It remains possible that if the model was operationalised in this way it would be as effective as the TPB in predicting cervical screening intentions. However, this would apply chiefly to the benefits and costs elements of the HBM; perceived susceptibility and perceived severity cannot easily be operationalised in this way.
Predicting Intentions to have a smear test

The study examined the relative contribution of attitudinal, normative, control and threat influences on intentions to have a smear test. The results showed that women’s attitudes to the behaviour are the most important influence on intentions to be screened. A measure of descriptive subjective norm was not related to intentions or behaviour, showing that, as suggested, as the behaviour in question is not observable by others, women’s intentions and behaviour may not be so influenced by the perception of what other people are doing. Despite the significant correlation with intentions, when examined multivariately perceived self efficacy did not significantly contribute to the prediction of intentions, and perceived behavioural control was not correlated with intentions. It can therefore be concluded that for uptake of cervical screening the TRA would be as useful a model as the TPB. This is in contrast to a number of studies of other behavioural domains which have found that perceived behavioural control significantly increases the prediction of intention (e.g., Ajzen and Driver, 1992; Beale and Manstead, 1991).

Perceptions of the severity of cervical cancer were not predictive of intentions and although perceptions of susceptibility were correlated with intentions, and significant in the multiple regression, the overall model was not significant. These results could be interpreted to imply that perceptions of threat are not important in the decision to undergo cervical screening. It is possible that this is because the women were familiar with this screening and it has been argued that threat perceptions may only be important for predicting the performance of novel behaviours (Rogers, 1983; Schwarzer, 1992). When an individual has carried out a behaviour in the past a perception of threat may be unnecessary to motivate them to form an intention to perform the behaviour again. The finding that perceptions of the severity of cervical cancer are not important for predicting intentions and behaviour is consistent with the literature. For example, Janz and Becker (1984) found perceptions of severity to be the least important HBM variable in their review of research using the model and Harrison et al. (1992) observed particularly low effect sizes for this variable in studies of uptake of screening.

For this group of women anticipated affect with respect to non-performance of the behaviour was not as important in predicting intentions as attitudes towards the act itself. It is possible that this is due to the nature of the behaviour in question and the severity of the consequences of action or inaction. In previous research where anticipated affect has been important (e.g., Parker, Manstead, Stradling and Reason, 1992; Parker, Manstead and Stradling, 1995; Richard, van der Pligt and de Vries, 1995) the behaviours in question, i.e., committing a driving violation and having unsafe sex, may in themselves be pleasurable, in contrast to having a smear test which is not. Therefore for screening, attitudes towards undergoing the behaviour are likely to be more salient than anticipated affect with respect to not undergoing the behaviour. In addition, the consequences of unsafe sex and driving violations may be severe whereas not having a smear test does not preclude the opportunity of having one at a later stage, again diminishing the importance of the perception of affect following non-performance of the behaviour.

Predicting Screening Behaviour

Whilst most (86%) of the women who participated in the study reported that they would attend for a smear test, far fewer (52%) actually did attend within the three months following the reporting of their intentions. This is in line with the similar poor predictions of
screening behaviour reported in the literature (e.g., meta analysis by Godin and Kok, 1996; study of health screening uptake by Conner and Norman, 1994). Such findings suggest that social cognition models are inadequate to explain uptake of health screening.

There are a number of reasons why there may be a discrepancy between intentions and behaviour (Sutton, 1998), in particular screening behaviour. Firstly, intentions when assessed by questionnaire are a proxy measure of an actual decision. In the current study the wording of the intention measures was hypothetical "if given the chance". A woman's decision to attend for screening might be made after she receives an invitation letter (in the current study this would have been up to approximately 6 weeks after the measurement of intention), or the decision might be made when she is visiting a doctor on another matter and therefore would take place only a few minutes before having the test. Screening decisions are probably made afresh each time the opportunity arises and are unlikely to be an habitual response. Studies applying social cognition models assume that participants have already made the decision or make it when they complete the questionnaire; however, this is arguably not the case. This assumption is a drawback of the way in which the models are measured, and may explain the relatively poor prediction of behaviour which is often observed.

Secondly, intentions may change after measurement, for example, due to the receipt of new information or the occurrence of unforeseen obstacles that prevent the behaviour being carried out. This may particularly occur if there is a long period of time between their measurement and the assessment of behaviour (Ajzen and Timko, 1986). Indeed it is possible that, as the time to act approaches, the negative aspects of the behaviour may become more salient, causing intentions to alter. In the present study there was a gap of up to three months.

If intentions to attend for screening are not very strong, it certainly seems plausible that they might change. However, in the current study many women expressed strong intentions but still did not carry them out. A failing of the social cognition models is to distinguish between inclined actors (individuals who intend to act and do) from inclined abstainers (individuals who intend to act but do not). For example, Orbell and Sheeran (1998) carried out an investigation of uptake of cervical screening based on Protection Motivation Theory (PMT; Rogers, 1975 and 1983). They found that whilst PMT was able to distinguish women who attended for cervical screening from those who did not, the theory could not identify the processes by which an intention to act was translated into behaviour.

Recent theoretical frameworks have been devised to explore this (e.g., Bagozzi and Warshaw's 1990 theory of trying and Gollwitzer's 1993 implementation intentions). These perspectives argue that further cognitive activity is required to translate an intention into action. Individuals who have furnished their goal intentions ("I intend to do x") with implementation intentions ("I intend to do x when situation y is encountered") – i.e. those who have carried out more “cognitive work” – should be, according to the theory, more successful in achieving their goal, e.g., having a smear test.

Gollwitzer argues that implementation intentions are particularly important when the behaviour is not habitual and where there is still conflict between acting here or there, now or later etc. Therefore it is plausible that implementation intentions would be a useful additional measure in social cognition models when these are being used to predict non-habitual and infrequent behaviours such as attending for screening. However, there has been little empirical work in the health arena to test this idea and future research examining the role of implementation intentions in predicting routine screening behaviour may prove to be fruitful.
CONCLUSIONS

This study of inner city women shows that a positive attitude towards having a smear test is the best predictor of an intention to be screened, being considerably more influential than a perception of a threat to health or perceived social pressure. The TPB emerged as superior to the HBM for explaining these screening intentions. However, before practical implications can be drawn from the findings it will be necessary to examine ways of improving the prediction of behaviour from intentions and beliefs.

References


