Original Article

Use of the theory of planned behaviour to assess factors influencing the identification of individuals at ultra-high risk for psychosis in primary care

Debra A. Russo,[1,2] Jan Stochl,[2] Tim J. Croudace,[2] Jonathan P. Graffy,[3] John Youens,[4] Peter B. Jones[1,2] and Jesus Perez[1,2]

Abstract

Aim: To design and assess the psychometric properties of a questionnaire to identify and measure factors that influence the identification of individuals at ultra-high risk for psychosis in primary care. It will inform the subsequent design of educational interventions to help general practitioners (GPs; primary care physicians) detect these individuals.

Methods: The questionnaire was developed using the theory of planned behaviour (TPB). A semistructured discussion group elicited beliefs underlying GPs' motivations to detect these individuals and informed the construction of a preliminary 106-item questionnaire incorporating all constructs outlined in the TPB. A pilot phase followed, involving 79 GPs from 38 practices across 12 counties in England, to define the determinants of

intention to identify these individuals. A psychometric model of item response theory was used to identify which items could be removed.

Results: The final instrument comprised 73 items and showed acceptable reliability ($\alpha = 0.77$–0.87) for all direct measures. Path analysis models revealed that all the TPB measures significantly predicted intention. Subjective norm, reflecting perceived professional influence, was the strongest predictor of intention. Collectively, the direct measures explained 35% of the variance of intention to identify individuals at ultra-high risk for psychosis, indicating a good fit with the TPB model.

Conclusion: The TPB can be used to identify and measure factors that influence identification of individuals at ultra-high risk for psychosis in primary care.

[1]Cameo Early Intervention Services, Cambridgeshire and Peterborough NHS Foundation Trust, and [2]Department of Psychiatry, and [3]General Practice and Primary Care Research Unit, University of Cambridge, Cambridge, and [4]Bretton Medical Practice, Peterborough, UK

Corresponding author: Dr Jesus Perez, Block 7, Ida Darwin, Fulbourn Hospital, Fulbourn, Cambridge CB21 5EE, UK. Email: jp440@cam.ac.uk

INTRODUCTION

A wealth of observational data indicates that the longer psychotic disorders are untreated the worse their prognosis.[1–3] The early identification and referral for treatment of people who might be at ultra-high risk for psychosis (UHR[4]) could reduce the duration of untreated psychosis (DUP)[5] and this is a desirable clinical behaviour in those who have the opportunity to refer.

General practitioners (GPs; primary care physicians) are the professional group most commonly contacted first on the help-seeking pathway of UHR patients.[6] However, early detection of psychosis in primary care is difficult because of the non-specific nature of behavioural and psychological antecedents of psychosis and their very low predictive value.[7]

Some studies have suggested that GPs do not usually endorse continuing medical education in

FIGURE 1. The theory of planned behaviour applied to the identification of ultra-high risk (UHR) for psychosis in primary care.
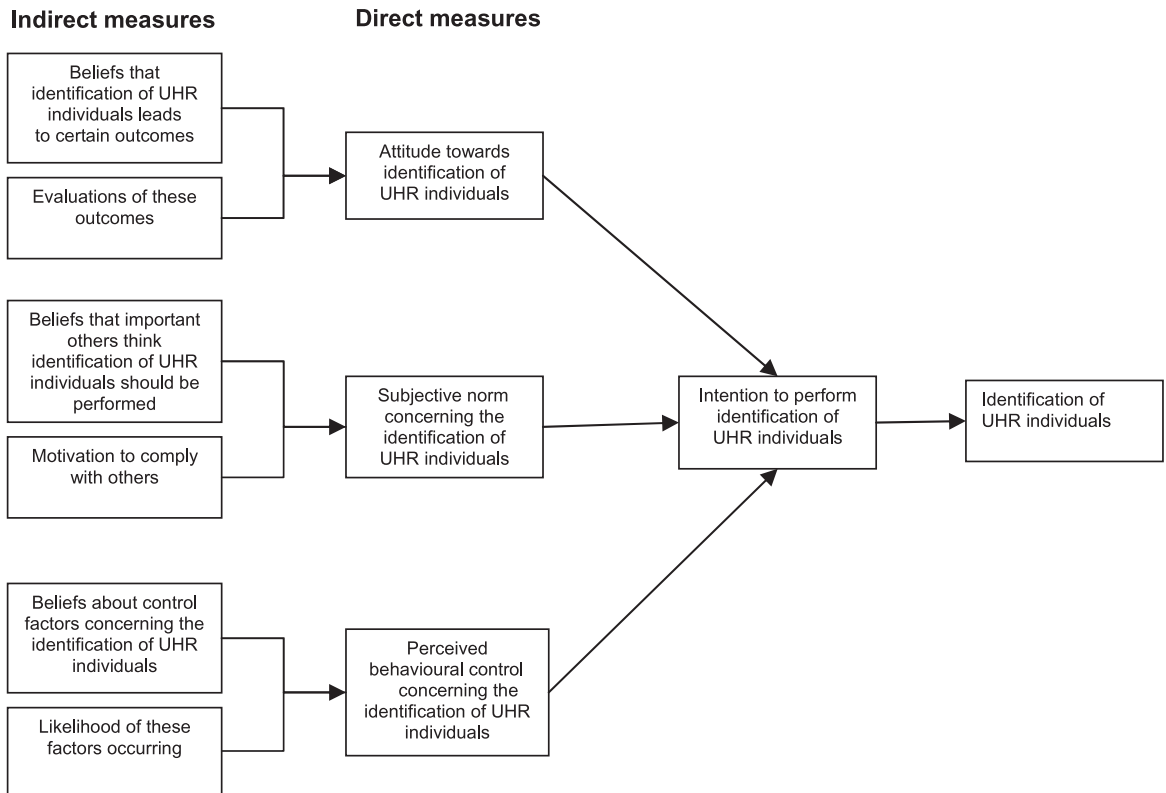
the early detection of psychotic disorders.[7] Moreover, education alone has failed to improve the management of mental health problems in primary care.[8] Indeed, a recent educational intervention in general practices that was intended to enhance awareness and skills in the detection of first-episode psychosis did not alter referral rates to specialized early intervention services or reduce DUP.[9] Thus, it is imperative to explore the factors that influence the identification of UHR for psychosis in primary care before attempting to design a programme to improve this aspect of care.

Interventions to change professional practice are often limited by the lack of an explicit theoretical and empirical basis.[10] The use of theory advances behavioural science[11] because it provides a generalizable framework for predicting and interpreting behaviour, informs the design of interventions and enables the evaluation of potential causal mechanisms.[12]

Theoretical framework

The theory of planned behaviour (TPB;[13,14] Fig. 1) was selected because it provides clear definitions of constructs and is supported by a comprehensive body of correlational evidence.[15] The TPB assumes that the majority of human behaviour is goal directed, socially influenced[13] and that individuals are logical and rational in their decision making.[16] It is a deliberative processing model that implies individuals make behavioural decisions based on careful consideration of available information.[17] In addition, it recognizes the necessity of estimating the extent to which the individual is capable of exercising control over the behaviour in question.[18] The model's ability to consider internal (e.g. abilities; knowledge) and external (e.g. opportunity; cooperation of others) control factors in relation to performing a behaviour[19] is important in professional contexts such as National Health Service (NHS) primary care, where both factors may influence GPs' clinical behaviour.

The TPB proposes that the act of identifying individuals at UHR for psychosis in primary care is predicted by the strength of a GP's intention to identify these individuals. This intention is guided by three considerations: whether the GP is in favour of identification (attitude); the intensity of social pressure

the GP perceives (subjective norm); and how much the GP feels in control of this identification (perceived behavioural control; PBC).

The TPB is acknowledged as an appropriate theory to predict health professional behaviour change[20] and offers insight into the processes underlying change in educational interventions in primary care.[21]

Aim

The aim of this study was to design and pilot items for a self-completion questionnaire to be used within primary care to identify and measure the factors that influence the identification of individuals at UHR for psychosis using TPB. This was undertaken as an initial phase recommended within the UK Medical Research Council framework[22] for the development and evaluation of a complex intervention. Results from this phase will inform the subsequent design of educational programmes for a cluster randomized controlled trial (RCT) that aims to evaluate the most effective way to help GPs identify these individuals.

METHODS

We followed the guidelines outlined by the co-author of the TPB[23] and reviews of current standard practice for its application.[17] We were also guided by recommendations from other researchers in this field.[24] The behaviour under investigation was defined as 'identifying individuals at UHR for psychosis during the consultation'.

Phase 1: Questionnaire development

Development of 'indirect' measures

The objective of this phase was to elicit commonly held beliefs about identifying UHR individuals from GPs. This enabled the development of questionnaire items based on these salient beliefs. Beliefs are central to the TPB; they provide the cognitive and affective foundations for attitudes, subjective norms and PBC.[23] An accurate understanding of the specific beliefs associated with identifying individuals at UHR for psychosis provides insight into why GPs may execute particular behaviours.[23] Therefore, this information can be important in the design of effective educational interventions.

Procedure. A semistructured discussion group was conducted to reveal salient beliefs underlying

motivations to detect UHR individuals. A GP (JY) and advocate of the study chaired the group without the presence of researchers as it has been proposed that individuals may not want to disclose their genuine attitudes, or motivations to an unfamiliar moderator.[25] Also, group dynamics stimulate conversations and are especially effective for capturing information about social norms and opinions within a specific population.[26] The discussion group comprised of a convenience sample of eight GPs known to and selected by JY.

Analysis. Two researchers independently analyzed the responses that emerged from the discussion. The beliefs relating to attitude, subjective norm and PBC are summarized in Figure 2.

Following this stage, a questionnaire item was constructed to assess the strength of each behavioural, normative and control belief. Additionally, a corresponding item was developed to assess the impact each belief might have on identifying UHR individuals. These indirect items and their format were then agreed by the entire research team (including JY), to ensure that each belief was represented in the questionnaire (Table 1).

Development of 'direct' measures

Direct measures are a summary estimate of a GP's global attitude, subjective norm and PBC towards identifying individuals at UHR for psychosis, and predictors of intention to perform such identification.[24] Intention captures the motivational factors that influence behaviours[19] and signifies a GP's decision to exert effort to attempt identification.[14]

Procedure. Direct measures should be tailored to specific behaviours and samples under investigation.[24] This process should not be guided by an arbitrary selection of questions or adopted items from previous studies.[23] Therefore, appropriate items for the target population (GPs) and specific context (during a consultation in NHS primary care) were agreed by the research team to reflect each direct construct (Table 2).

Phase 2: Questionnaire construction

A 106-item preliminary version of the questionnaire was constructed, including indirect and direct measures for attitude, subjective norm, PBC and intention. The questionnaire included instructions regarding its completion and an introduction about how an individual at UHR for psychosis might present in consultation. Feedback questions

FIGURE 2. General practitioners' behavioural, normative and control beliefs elicited during the discussion group. NHS, National Health Service; UHR, ultra-high risk.
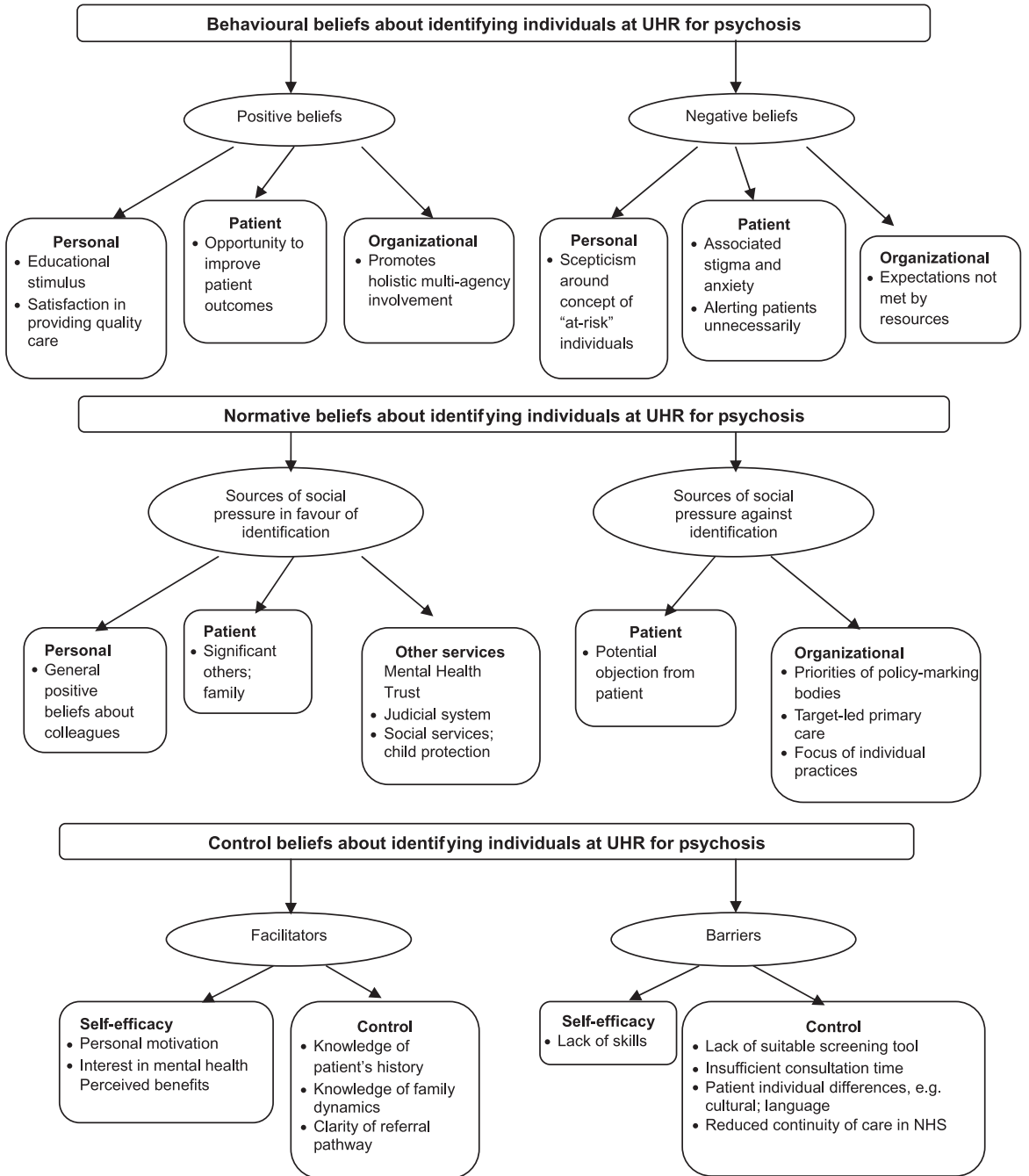
Behavioural beliefs about identifying individuals at UHR for psychosis

Positive beliefs

Personal
- Educational stimulus
- Satisfaction in providing quality care

Patient
- Opportunity to improve patient outcomes

Organizational
- Promotes holistic multi-agency involvement

Negative beliefs

Personal
- Scepticism around concept of "at-risk" individuals

Patient
- Associated stigma and anxiety
- Alerting patients unnecessarily

Organizational
- Expectations not met by resources

Normative beliefs about identifying individuals at UHR for psychosis

Sources of social pressure in favour of identification

Personal
- General positive beliefs about colleagues

Patient
- Significant others; family

Other services
Mental Health Trust
- Judicial system
- Social services; child protection

Sources of social pressure against identification

Patient
- Potential objection from patient

Organizational
- Priorities of policy-marking bodies
- Target-led primary care
- Focus of individual practices

Control beliefs about identifying individuals at UHR for psychosis

Facilitators

Self-efficacy
- Personal motivation
- Interest in mental health
Perceived benefits

Control
- Knowledge of patient's history
- Knowledge of family dynamics
- Clarity of referral pathway

Barriers

Self-efficacy
- Lack of skills

Control
- Lack of suitable screening tool
- Insufficient consultation time
- Patient individual differences, e.g. cultural; language
- Reduced continuity of care in NHS

TABLE 1. Examples of questionnaire items assessing indirect attitude, subjective norm and PBC

Belief strength	n items	Sample item	Impact of belief	n items	Sample item
Attitude	18	The labelling associated with the identification of patients at UHR for psychosis has a negative effect for the patient	Outcome evaluation for each attitudinal belief	18	Negative labelling for the patient is: *Extremely undesirable – extremely desirable*
Subjective norm	7	Other GPs do not attempt to identify patients at UHR for psychosis during the consultation	Motivation to comply with each group or individual	7	How much do you care what other GPs do? *Not at all – very much*
Perceived behavioural control	16	I lack the specific skills needed to identify a patient at UHR for psychosis during the consultation	The power each control belief exerts	16	Having the specific skills would make identification: *Less likely – more likely*

GPs, general practitioners; UHR, ultra-high risk.

TABLE 2. Examples of questionnaire items measuring direct attitude, subjective norm, PBC and intention

TPB construct		n items	Sample item
Attitude		9	Identifying a patient at UHR for psychosis during the consultation would be *harmful – beneficial*
Subjective norms		5	People whose views I value within my profession would not approve of me identifying patients at UHR for psychosis during the consultation: *Strongly agree – strongly disagree*
Perceived behavioural control	Self-efficacy	3	I could identify a patient at UHR for psychosis during the consultation without difficulty: *Strongly agree – strongly disagree*
Controllability		3	The decision to identify at UHR for psychosis during the consultation is beyond my control: *Strongly agree – strongly disagree*
Intention	Intention	3	I intend to identify patients at UHR for psychosis during the consultation: *Strongly agree – strongly disagree*
Self-prediction		1	I expect to identify patients at UHR for psychosis during the consultation: *Strongly agree – strongly disagree*

TPB, theory of planned behaviour; UHR, ultra-high risk.

concerning ambiguity, content, missing factors and format guided any necessary subsequent refinements. Finally, sociodemographic questions were added to describe the sample.

Phase 3: Questionnaire evaluation and refinement

The aim of this phase was to evaluate the acceptability and feasibility of administering the questionnaire within a representative sample of GPs in NHS primary care, in addition to evaluating its reliability.

Procedure

Questionnaires and information sheets were posted to 400 GPs working in 38 practices across 12 counties in England between September and November 2009. These practices were selected using maximum variation sampling and obtained from the NHS choices website (http://www.nhs.uk/servicedirectories/Pages/servicesearch.aspx). Selection criteria included: (i) surgeries with a minimum of five GPs; (ii) from different counties in an attempt to recruit a sample of GPs practising in geographically and socially diverse areas. A postal reminder was sent to non-respondents 3 weeks later.

Ethical approval was obtained as part of the National Institute for Health Research (NIHR) research programme RP-PG-0606-1335.

Analysis

A psychometric evaluation of the questionnaire was conducted to confirm that information obtained

using a reduced-item final tool would still provide a sound basis for decision making.

A modern approach, in the form of a psychometric item response model – the polytomous graded response model[27] was used to examine the validity of each item within direct and indirect measures and to inform decisions regarding the removal of items. The internal consistency of the direct measures of attitude, subjective norm and PBC was assessed using Cronbach's alpha coefficient on both the original and reduced-item questionnaires. An internal consistency criterion is inappropriate for the evaluation of reliability of indirect measures[23] because they are formative rather than reflective indicators of the underlying construct.[28] Alternatively, correlations between direct and indirect measures of the same construct were calculated to confirm the convergent validity of the indirect measures. Confirmatory factor analysis[29] was conducted on all measures to assess the relative importance of each item on the total construct, thus confirming the structural conformity of the final questionnaire with the TPB. The relationship between intention and the indirect and direct measures were investigated using path analysis, with 'intention' specified as the dependent variable. Path analysis was used to reveal the degree of fit between the TPB and actual data, in addition to providing an estimation of multiple equation regression models linking the TPB variables.[30]

Data were analyzed using the statistical software package NCSS Version 7.1[31] for descriptive statistics; item analysis for the purpose of identifying redundant items for removal from the questionnaire was conducted using MULTILOG; and confirmatory factor analysis and path analysis was performed with Mplus Version 6.1 (Scientific Software International, Chicago, IL).[32]

RESULTS

Descriptive statistics of the respondents

Eighty-two (20.5%) GPs returned questionnaires. Due to incomplete fields, three questionnaires were excluded from the analyses. The mean time taken to complete the questionnaire was reported as 16.2 (standard deviation (SD) = 6.4) minutes. The mean age of participating GPs was 45.6 (SD = 9.4). Men ($n = 42$; 53%) and women ($n = 37$; 47%) were represented almost evenly in the sample. The mean number of years GPs had been practising was 16.4 (SD = 9.5). Approximately half ($n = 40$; 50.6%) of the sample reported attending some kind of mental health training during their careers. GPs reported seeing an average of 32 (SD = 9.3) patients per day and estimated that the mean number of patients they saw each day with a mental health problem was 7.5 (SD = 4.8).

Psychometric properties of the questionnaire

Validity

The polytomous graded response model[27] was used to study the validity of items within specific constructs. Also, distribution of responses for each item was assessed. This allowed the identification of items that required rewording, and those that were redundant because they added little information or offered similar response options. For the indirect measures, items were eliminated because of their ambiguity or similarity to other items. Final decisions on item exclusion were based on extensive discussions within the research team to avoid invalidation of the questionnaire due to exclusion of essential items that had emerged during the discussion group. Thirty-three items were excluded, resulting in a 73-item final questionnaire. Subsequent analyses were conducted on this reduced scale.

Pearson's correlations between the indirect and direct measures of the corresponding construct revealed each set of indirect beliefs was significantly correlated with their direct predictor of intentions: behavioural beliefs with attitudes ($r = 0.54$; $P < 0.001$); normative beliefs with subjective norms ($r = 0.59$; $P < 0.001$); and control beliefs with PBC ($r = 0.52$; $P < 0.001$). This suggests that indirect measures were well constructed and adequately covered the breadth of the measured construct.[33]

To assess the structural conformity of the final questionnaire with the TPB, factor analysis was used. The resulting coefficients can be interpreted as correlations between the measured construct and corresponding item. Higher coefficients indicate higher factor validity. Therefore, these items are superior at discriminating between GPs with low and high levels of the corresponding latent construct.

Table 3 shows the items with the highest factor validity within direct and indirect measures. Items within all direct measures, indirect attitude and subjective norm measured the corresponding construct satisfactorily; only one item within direct PBC and three items within indirect attitude showed a factor validity lower than 0.5. However, indirect PBC was less coherent. All items within this construct showed low intercorrelations, in accordance with

TABLE 3. Items with the highest factor validity within indirect and direct measures.

Direct Measures		Item	Scoring	Factor Validity
Attitude		If I were to identify patients at UHR for psychosis during the consultation, it would be *Valuable/Worthless*	+1–+7	0.93
Subjective Norm		It is expected of me that I identify patients at UHR for psychosis during the consultation *Strongly Agree/Disagree*	+1–+7	0.83
Perceived Behavioural Control		I am confident that I could identify patients at UHR for psychosis during the consultation if I wanted to *Strongly Agree/Disagree*	+1–+7	0.95
Indirect Measures		Item	Scoring	Factor Validity
Attitude	Belief Strength	If I were to identify patients at UHR for psychosis during the consultation it would maintain their social functioning (e.g. support networks & relationships) *Strongly Agree/Disagree*	+1–+7	0.77
	Impact of Belief	Maintaining social functioning of patients is unimportant-important *Strongly Agree/Disagree*	−3–+3	
Subjective Norm	Belief Strength	Other GPs would approve of me identifying patients at UHR for psychosis during the consultation *Strongly Agree/Disagree*	−3–+3	0.87
	Impact of Belief	How much do you care what Other GPs think you should do? *Not at all/very much*	+1–+7	
Perceived Behavioural Control	Belief Strength	There is diversity in the cultural beliefs of my patients *Rarely/Frequently*	+1–+7	0.65
	Impact of Belief	For me, diversity in cultural beliefs would make identifying a patient at UHR for psychosis during the consultation *Difficult/Easier*	−3–+3	

GPs, general practitioners; UHR, ultra-high risk.

Ajzen's[23] premise that internal consistency is not a necessary feature of indirect measures. Therefore, factor analysis was not appropriate for this construct and the reported factor validity may not be a reliable figure.

Reliability

The lower bound estimates of internal consistency estimated by Cronbach's alpha for the original and reduced questionnaires are shown in Table 4. The values confirmed improvement for each of the constructs in the reduced version with the exception of that for intention which remained the same.

Distribution of GPs' scores for all TPB constructs

Table 5 summarizes data obtained from the questionnaires. Higher scores indicate that a GP intends to, is in favour of, experiences social pressure to, and feels in control of identifying those who may be at UHR for psychosis.

For indirect measures, mean scores reflected overall positive attitudes towards favourable pressure to perform and control over the identification

TABLE 4. Cronbach's alphas and standard errors of measurement (in brackets) for the direct measures of the original and reduced form questionnaires

Direct measures	Original questionnaire 106 items	Reduced questionnaire 73 items
Intention	0.87 (1.64)	0.87 (1.64)
Attitude	0.76 (3.18)	0.83 (2.71)
Subjective norms	0.64 (3.11)	0.74 (2.65)
PBC	0.58 (3.00)	0.72 (2.43)

PBC, perceived behavioural control.

of individuals at UHR for psychosis. PBC was the lowest (6.1), which indicates a very weak level of positive control, and attitude the highest, but still showing a low score (71.0).

Mean scores for direct measures were above the mid-scale score for intention and attitude, and below the mid-scale score for subjective norm and PBC. This suggests that GPs considered identifying individuals at UHR for psychosis a worthwhile behaviour and would attempt identification in their practice, but that they believed that their peers might not approve this. In addition, their

TABLE 5. Distribution of GPs' scores for all TPB constructs

Indirect measures	Final no. of items	Mean	Standard deviation	Standard error	Minimum score	Maximum score	Possible range of total scores
Attitude	18	71.0	31.4	3.53	−14	145	−378 to +378
Subjective norm	12	34.2	33.4	3.76	−19	117	−147 to +147
PBC	20	6.1	21.1	2.37	−39	63	−336 to +336
Direct measures	Final no. of items	Mean	Standard deviation	Standard error	Minimum score	Maximum score	Mid-scale score
Intention	4	21.2	4.7	0.53	6	28	16
Attitude	7	38.9	5.7	0.65	24	49	36
Subjective norm	4	17.8	4.6	0.52	6	28	20
PBC	8	23.5	4.2	0.47	13	35	24

PBC, perceived behavioural control.

confidence and control over identification was low.

Prediction of 'intention'

Path analysis revealed that all the direct measures of TPB significantly predicted intention. Subjective norm (perceived professional influences) was the strongest predictor of intention (regression coefficient = 0.41, $P < 0.001$), followed by attitude (0.30, $P < 0.01$) and PBC (0.22, $P < 0.01$). Collectively, the direct measures explained 35% of the variance of intention to identify UHR for psychosis.

DISCUSSION

The TPB was helpful in designing our questionnaire to expose and measure factors that might contribute to a GP's decision to attempt identification of an individual that may be at UHR for psychosis. Only by clearly understanding the motivations and barriers to this decision can we attempt to alter the identification behaviour and subsequently promote referral. The TPB facilitated the understanding of specific beliefs held by GPs concerning this identification. Beliefs elicited in the semistructured discussion group indicated that both internal and external factors contribute towards the decisions GPs make concerning identification. The responses that emerged from the discussion group revealed common influences for indirect belief-based measures; GPs expressed personal, patient and organizational related beliefs underlying their attitudes and subjective norms.

Improving outcomes emerged as the most important source of patient-related positive beliefs demonstrated by the items with the highest factor

validity within the indirect attitude construct. Normative beliefs included perceived pressure for identification from colleagues and other services such as mental health teams and social services. The items with the highest factor validity within this construct indicated that most GPs perceived their behaviour in line with that of colleagues. However, GPs perceptions are not always accurate, since, in reality, their behaviour as a group varies considerably.[34] Providing GPs with more information about the actual norms of identification rates could be beneficial. The proposal that the PBC component should comprise separate measurement of controllability and self-efficacy[35] was supported by our study. Facilitators of self-efficacy included personal motivation, and an interest in mental health. Lack of skills was the main barrier to self-efficacy. Control factors were the major influence for PBC. Knowledge of the patient's personal and family background was an important facilitator of PBC.

These findings support previous work exposing the factors that might prevent GPs' incorporation of new knowledge and skills into their practice. Cabana et al.[36] identified lack of awareness, familiarity, agreement, self-efficacy and outcome expectancy, in addition to the inertia of previous practice, and external barriers as influential factors. This implies that the items included in our questionnaire reflect common concerns for many GPs within primary care and thus supports its validity.

Results from the analysis of the direct measures revealed that most GPs had positive intentions and attitudes towards identifying individuals at UHR for psychosis. Intentions to identify were most strongly predicted by subjective norms. This implies GPs' perceptions of whether other GPs identify UHR individuals; and whether significant others (e.g. patients, colleagues, health-care

system) approve or disapprove of identification are prominent motivational factors. This notable influence of subjective norm on GP's behaviour has been found in previous studies.[37,38] Accordingly, effective interventions would need to prioritize the development of strategies that targeted this potential causal mechanism to prompt behavioural changes in this population.

Our questionnaire proved to be reliable, with the analysis supporting the predictive power of the TPB with regards to intention. The combination of attitude, subjective norm and PBC explained 35% of the variance of intention to identify individuals at UHR for psychosis. This is slightly lower than the average percentage (39%) of explained variance in intention reported for a variety of behaviours in the latest meta-analytic review of the TPB.[19]

Our findings may be limited by the use of self-reports as measures of beliefs and intention, and the omission of objective measures of the target behaviour. The latter will be addressed in a subsequent cluster RCT associated with this work. Physicians' self-reports on their practice tend to overestimate their adherence to guidelines[39] and it follows that GPs' self-reports of their beliefs associated with, and intentions to perform, identification of individuals at risk may also be subject to social desirability bias. This could threaten the validity of findings by obscuring relationships between variables. However, returned questionnaires were anonymous, with no incrimination or benefits from participating.

The low sample size ($n = 79$) and response rate (20.5%) from the invited sample ($n = 400$) was another limitation given that respondents may have differed systematically from non-respondents. There could be a case to validate the revised 73 item instrument in an independent sample.

A strength of this study is the thorough psychometric evaluation of our TPB questionnaire. Since the majority of TPB questionnaires are used only once with a specific population and behaviour, a thorough psychometric evaluation is usually considered non-feasible and therefore omitted.[40]

To our knowledge, this is the first study that has employed a theoretical framework to understand the factors that influence the identification of individuals at UHR for psychosis in primary care. To determine why interventions are unsuccessful or how successful interventions have their effect, we need to appreciate what variations of behavioural processes are responsible for any observed change.[41] As Ceccato *et al.*[42] argued, the utilization of behavioural theories to change clinical habits should guide all aspects of the intervention, that is

development, dissemination, implementation and evaluation. The generalizability of results of atheoretical studies to primary care is questionable because they provide little information to guide the choice or optimize the components of complex interventions in clinical practice.

This research demonstrates how the TPB can be used to identify and measure factors that influence identification of individuals at UHR for psychosis in primary care. We have confirmed the feasibility, reliability and acceptability of a TPB-based questionnaire to identify GPs' beliefs and intentions concerning the identification of individuals at UHR for psychosis. The information collated from the questionnaire will allow the identification of specific barriers that can be targeted with strategies designed to change primary care practice with respect to identifying UHR individuals. This could be important for improving referral pathways and reducing the duration of untreated psychosis. Michie *et al.*'s[43] work matching theoretically derived behavioural determinants with the most effective behaviour change techniques will facilitate the translation of this theoretically based causal model into a practical intervention to educate GPs in this area of mental health.

The recommendation that an original TPB questionnaire is developed every time a new behaviour is studied, or the same behaviour is studied with a new population[23] suggests similar methodology can be used to help GPs in the identification of other disorders and in a variety of mental health organizational environments.

A copy of the questionnaire is available at http://www.cameo.nhs.uk/Research/OngoingStudies/LEGSResearch/tabid/1445/language/en-GB/Default.aspx

REFERENCES

1. Perkins DO, Gu H, Boteva K, Lieberman JA. Relationship between duration of untreated psychosis and outcome in first-episode schizophrenia: a critical review and meta-analysis. *Am J Psychiatry* 2005; **162**: 1785–804.
2. Marshall M, Lewis S, Lockwood A, Drake R, Jones P, Croudace T. Association between duration of untreated psychosis and outcome in cohorts of first-episode patients: a systematic review. *Arch Gen Psychiatry* 2006; **62**: 975–83.
3. de Koning MB, Bloemen OJN, van Amelsvoort TAMJ *et al*. Early intervention in patients at ultra high risk of psychosis: benefits and risks. *Acta Psychiatr Scand* 2009; **119**: 426–42.
4. Yung AR. Commentary: the schizophrenia prodrome: a high-risk concept. *Schizophr Bull* 2003; **29**: 859–65.
5. Woods SW, Addington J, Cadenhead KS *et al*. Validity of the prodromal risk syndrome for first psychosis: findings from the North American Prodrome Longitudinal Study. *Schizophr Bull* 2009; **35**: 894–908.
6. Platz C, Albrecht DS, Cattapan-Ludewig K *et al*. Help-seeking pathways in early psychosis. *Soc Psychiatry Psychiatr Epidemiol* 2006; **41**: 967–74.
7. Simon A, Lester HE, Tait L *et al*. The international study on general practitioners and early psychosis (IGPS). *Schizophr Res* 2009; **108**: 182–90.
8. Gilbody S, Whitty P, Grimshaw J, Thomas R. Educational and organisational interventions to improve the management of depression in primary care: a systematic review. *JAMA* 2003; **289**: 3145–51.
9. Lester HE, Birchwood M, Freemantle N, Michail M, Tait L. REDIRECT: cluster randomised controlled trial of GP training in first-episode psychosis. *Br J Gen Pract* 2009; **59**: 183–90.
10. Foy R, Francis JJ, Johnston M *et al*. The development of a theory-based intervention to promote appropriate disclosure of a diagnosis of dementia. *BMC Health Serv Res* 2007; **7**: 207. doi:10.1186/1472-6963-7-207.
11. Michie S, Prestwich A. Are interventions theory-based? Development of a theory coding scheme. *Health Psychol* 2010; **29**: 1–8.
12. Eccles M. The Improved Clinical Effectiveness through Behavioral Research Group (ICEBeRG). Designing theoretically-informed implementation interventions. *Implement Sci* 2006; **1**: 4. doi:10.1186/1748-5908-1-4.
13. Ajzen I. From intentions to action: a theory of planned behavior. In: Kuhl J, Beckman J, eds. *Action Control: From Cognitions to Behaviors*. New York: Springer, 1985; 11–39.
14. Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process* 1991; **50**: 179–211.
15. Skår S, Sniehotta FF, Araujo-Soares V, Molloy GJ. Prediction of behaviour vs. prediction of behaviour change: the role of motivational moderators in the theory of planned behaviour. *Appl Psychol-Int Rev* 2008; **57**: 609–27.
16. Sandberg T, Conner M. Anticipated regret as an additional predictor in the theory of planned behaviour: a meta-analysis. *Br J Soc Psychol* 2008; **47**: 589–606.
17. Conner M, Sparks P. Theory of planned behaviour and health behaviour. In: Conner M, Sparks P, eds. *Predicting Health Behaviour: Research and Practice with Social Cognition Models*, 2nd edn. Mainhead: Open University Press, 2005; 170–222.
18. Ajzen I, Madden TJ. Prediction of goal-directed behavior: attitudes, intentions, and perceived behavioral control. *J Exp Soc Psychol* 1986; **22**: 453–74.
19. Armitage CJ, Conner M. Efficacy of the theory of planned behavior: a meta-analytic review. *Br J Soc Psychol* 2001; **40**: 471–99.
20. Walker A, Watson M, Grimshaw J, Bond C. Applying the theory of planned behaviour to pharmacists' beliefs and intentions about the treatment of vaginal candidiasis with non-prescription medicines. *Fam Pract* 2004; **21**: 670–6.
21. Ramsay CR, Thomas RE, Croal BL, Grimshaw JM, Eccles MP. Using the theory of planned behaviour as a process evaluation tool in randomised trials of knowledge translation strategies: a case study from UK primary care. *Implement Sci* 2010; **5**: 71. doi:10.1186/1748-5908-5-71.
22. Medical Research Council. *Developing and Evaluating Complex Interventions: New Guidance*. London: MRC, 2008. [Cited 23 Feb 2009.] Available from URL: http://www.mrc.ac.uk/Utilities/Documentrecord/index.htm?d=MRC004871
23. Ajzen I. *Constructing a TpB Questionnaire: Conceptual and Methodological Considerations*, 2002, Revised January 2006. [Cited 24 Feb 2009.] Available from URL: http://www.people.umass.edu/aizen/pdf/tpb.measurement.pdf
24. Francis JJ, Eccles MP, Johnston M *et al*. *Constructing Questionnaires Based on the Theory of Planned Behaviour. A Manual for Health Services Researchers*. Centre for Health Services Research, University of Newcastle upon Tyne, UK, 2004. [Cited 23 Feb 2009.] Available from URL: http://people.umass.edu/aizen/pdf/Francis%20etal.TPB%20research%20manual.pdf
25. Kruger RA, Casey MA. *Focus Groups: A Practical Guide for Applied Research*. Thousand Oaks, CA: Sage Publications, 1994.
26. Kitzinger J. Introducing focus groups. *BMJ* 1995; **311**: 299–302.
27. Samejima F. Estimation of latent ability using a response pattern of graded scores. *Psychometrika Monogr Suppl* 1969; **34**: 100–14.
28. Conner M, Kirk S, Cade J, Barrett J. Why do women use dietary supplements? The use of the theory of planned behavior to explore beliefs about their use. *Soc Sci Med* 2001; **52**: 621–33.
29. Brown TA. *Confirmatory Factor Analysis for Applied Research*. New York: Guilford Press, 2006.
30. Wolfle LM. The introduction of path analysis to the social sciences, and some emergent themes: an annotated bibliography. *Struct Equation Model* 2003; **10**: 1–34.
31. Hintze J. NCSS (Version 7.1). NCSS, LLC. UT, Kaysville, 2008.
32. Muthén LK, Muthén BO. Mplus: statistical analysis with latent variables (Version 6.1). Los Angeles, CA, 1998–2010.
33. Francis J, Eccles M, Johnston M *et al*. Explaining the effects of an intervention designed to promote evidence-based diabetes care: a theory-based process evaluation of a pragmatic cluster randomised controlled trial. *Implement Sci* 2008; **3**: 50. doi:10.1186/1748-5908-3-50.
34. Green H, Johnston O, Cabrini S, Fornai G, Kendrick T. General practitioner attitudes towards referral of eating-disordered patients: a vignette study based on the theory of planned behaviour. *Ment Health Fam Med* 2008; **5**: 213–8.
35. Ajzen I. Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *J Appl Soc Psychol* 2002; **32**: 665–83.
36. Cabana MD, Rand CS, Powe NR *et al*. Why don't physicians follow clinical practice guidelines? A framework for improvement. *JAMA* 1999; **282**: 1458–65.
37. Limbert C, Lamb R. Doctors' use of clinical guidelines: two applications of the theory of planned behaviour. *Psychol Health Med* 2002; **7**: 301–10.
38. Godin G, Bélanger-Gravel A, Eccles M, Grimshaw J. Health-care professionals' intentions and behaviours: a systematic review of studies based on social cognitive theories. *Implement Sci* 2008; **3**: 36. doi:10.1186/1748-5908-3-36.
39. Adams AS, Soumerai SB, Lomas J, Ross-Degnan D. Evidence of self-report bias in assessing adherence to guidelines. *Int J Qual Health Care* 1999; **11**: 187–92.

40. French DP, Cooke R, McLean N, Williams M, Sutton S. What do people think about when they answer theory of planned behaviour questionnaires? A 'think aloud' study. *J Health Psychol* 2007; **12**: 672–87.
41. Michie S, Fixsen D, Grimshaw JM, Eccles MP. Specifying and reporting complex behaviour change interventions: the need for a scientific method. *Implement Sci* 2009; **4**: 40. doi:10.1186/1748-5908-4-4.
42. Ceccato NE, Ferris LE, Manuel D, Grimshaw JM. Adopting health behavior change theory throughout the clinical practice guideline process. *JCEHP* 2007; **27**: 201–7.
43. Michie S, Johnston M, Francis J, Hardemann W, Eccles M. From theory to intervention: mapping theoretically derived behavioural determinants to behaviour change techniques. *Appl Psychol-Int Rev* 2008; **57**: 660–80.