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Some problems with social cognition models:  
a pragmatic and conceptual analysis

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Running head: Problems with social cognition models

**Abstract**

Empirical papers published between 1997-2001 from four health psychology journals which tested or applied one or more social cognition model (TRA, TPB, HBM and PMT, n=47) were scrutinised for their pragmatic and conceptual basis. This assessment indicated that in terms of their pragmatic basis these four models were useful for guiding research. The analysis of their conceptual basis was less positive. First, it is argued that these models do not enable the generation of hypotheses as their constructs are unspecific. They therefore cannot be tested. Secondly, they focus on analytic truths rather than synthetic ones and the conclusions resulting from their application are often true by definition rather than by observation. Finally, they may create and change both cognitions and behaviour rather than describe them.

Key words: social cognition models, critique, problems, health cognitions

Despite the widespread use in health psychology of social cognition models there have been

some critiques. Conner and Norman (1996) described an overlap in the variables between the different models, Sutton (1998) concluded that although such models are designed to predict behaviour they leave much of the variance in behaviour unexplained and Smedlund (2000) has criticised them for their logical construction. This paper highlights further problems with the Health Belief Model (HBM, Becker & Rosenstock, 1987), the Theory of Reasoned Action (TRA, Fishbein & Ajzen, 1975), the Protection Motivation Theory (PMT, Rogers, 1975) and the Theory of Planned Behaviour (TPB, Ajzen, 1985) in terms of their pragmatic and conceptual basis and asks whether they can be considered ‘good theories’. Specifically it addresses the questions: ‘Are the theories useful?’, ‘Can the theory be tested?’, ‘Does the theory use analytic or synthetic truths?’ and ‘Does the theory access or create cognitions?’.

## **Method**

### **Sample**

The main journal outlets for health psychology work for researchers in the US, the UK and across other European countries are ‘Health Psychology’ published by the American Psychological Association, the ‘British Journal of Health Psychology’ published by The British Psychological Society, ‘Psychology and Health’ published by Brunner Routledge which is the official journal of the European Health Psychology Society and the ‘Journal of Health Psychology’ published by Sage. All papers published in these journals between 1997 and 2001 (inclusive) excluding commentaries, introductions to special issues and letters to the editor which focused on the most common structured models (HBM, TRA, TPB, PMT) were scrutinised for their pragmatic and conceptual basis. Exemplar papers were noted and illustrative quotes were recorded.

## **Results**

## **The papers**

During the 5 year period from 1997 - 2001, 923 papers were published in these four journals. Of these, 727 did not focus on health related cognitions. The remaining 196 papers (21%) contained a substantial focus on health related cognitions. Twenty two of these were non empirical reviews or discussion pieces. A total of 47 empirical papers focusing on structured models form the basis of this paper: the 'Health Belief Model' (n=9), the 'Protection Motivation Theory' (n=5), the 'Theory of Reasoned Action' (n=5) and the 'Theory of Planned Behaviour' (n=33) (5 papers focused on two models simultaneously).

## **The pragmatic basis to a theory**

### **Are the theories useful?**

In the sample of papers examined the behaviours covered were condom use, exercise, sugar restriction, sun cream use, health screening, exercise, low fat diet, dental flossing, breast self examination, safety helmet use, providing care for parents, donating bone marrow, HRT use, ecstasy use, the request for hospital autopsies, smoking, antibiotic prescribing and voting. These papers constituted 5.1% of the total number of papers published in the four journals over the five year period. The journal offering most of its space to research relating to health cognitions was 'Psychology and Health' (33.2%, n=82), then 'Health Psychology' (19.5%, n=63), then the 'British Journal of Health Psychology' (18.5%, n=25) with the 'Journal of Health Psychology' showing the least commitment to this perspective (11.9%, n=26). Of these papers, the journal publishing the largest proportion of research relating to the four structured models (HBM, PMT, TRA and TPB) was the 'British Journal of Health Psychology' (40%, n=10), then 'Psychology and Health' (33%, n=27), then the 'Journal of Health Psychology' (19.2%, n=5) and the least was published in 'Health Psychology' (7%, n=5).

From the perspective of researchers these models are therefore useful. The models are also used to inform service development and the development of health related interventions to promote health behaviours. This sample of papers contained five theory based interventions. These aimed to reduce sun tanning based upon the PMT (McClenden & Prentice-Dunn, 2001), to explore the relationship between alcohol use and the intention to use condoms (Conner, Graham & Moore, 1999), to increase sun cream use using the HBM (Castle, Skinner & Hampson, 1999) to encourage safety helmet use using the TPB (Quine, Rutter & Arnold, 2001) and to promote cervical cancer screening using the TPB and implementation intentions (Sheeran & Orbell, 2000).

### **The conceptual basis to a theory**

#### **Can the theory be tested?**

A 'good theory' should consist of constructs which are sufficiently specific so as to generate hypotheses. Such hypotheses should be testable and, in principle at least, a good theory should be able to be rejected. Of the papers examined, most indicated that they were 'testing' a theory and the large majority concluded that their data provided support for their particular model. For example, Povey, Conner, Sparks, James and Shepherd (2000) concluded that 'the TPB can be applied to the dietary behaviours of eating a low fat diet', Steen, Peay and Owen (1998) concluded from their study of intentions to minimise sun exposure that 'Our findings generally supported the theory of reasoned action' (p.116) and Flynn et al (1997) concluded from their study of voting behaviour using the TPB that 'Legislator surveys that use this conceptual model can provide results relevant to understanding tobacco policy development' (p.401). But what do such statements of support really mean? What results would indicate that the models being used were not a useful framework? Could data be collected that would

lead to the model being rejected?

Within the present sample, the majority reported that at least one of the variables within the given model did not predict the outcome variable being studied. For example, many studies using the TPB reported no role for subjective norms (eg. Bozionelos & Bennett, 1999; Jamner, Wolitski, Corby & Fishbein, 1998; De Wit, Stroebe, De Vroome, Sandfort & Van Griensen, 2000), some showed no predictive role for perceived behavioural control (eg. Flynn et al, 1997; Sutton, McVey & Glanz, 1999) and some showed no role for attitudes (eg. Yzer, Siero & Buunk, 2001). Similarly, some studies using the HBM reported no role for susceptibility (eg. Castle et al, 1999; Pakenham, Pruss & Clutton, 2000) and those using the PMT found no role for a range of variables (eg. Murgraff, White & Phillips, 1999; Plotnikoff & Higginbotham, 1998). Further, all the papers examined left much of the variance unexplained with explained variance ranging from 1% to 65% for behaviour and 14% to 92% for behavioural intentions.

The variables described by the models may not be predictive and the variance explained is low, but, instead of rejecting the models several explanations are offered. The first explanation argues that the model should be accepted but that the variables were not operationalised properly. For example, Murgraff et al (1999) suggested from their study of the PMT that their results may be due to the 'wording of the intention measure' (p. 348) and similarly Castle et al (1999) suggested that 'the operationalisation of constructs of the Health Belief Model may not have been optimal' (p.526). The second explanation suggests that the model should be accepted but that sample characteristics may explain their results. For example, Hagger, Chatzisarantis, Biddle and Orbell (2001) argued that the usefulness of the TPB depends upon the type of population used and that the young people in their study may have different

cognitive predictors of their behaviour than an older sample. Similarly, De Wit et al (2000) suggested that the type of population being considered by those answering the questionnaire may also influence the way the cognitions relate to behaviour and differentiate between casual and primary sexual partners in their study using the TPB. Other studies explain the failure of the model in terms of the type of behaviour studied. For example, Sheeran, Conner and Norman (2001) argued that the low variance found in their study using the TPB is 'probably because the health screening was a novel behaviour for participants' (p.17) and Murgraff et al (1999) suggested that the performance of the PMT in their study of single occasion drinking was due to participants being 'exposed to a new, previously unknown threat to their health' (p.347). Sutton et al (1999) also explained the failure of the TPB in their study assessing intentions to use condoms in terms of the characteristics of the behaviour in question. Finally, several papers argued that the model being studied should be accepted but only if it is extended. For example, Sparks, Conner, James, Shepherd and Povey (2001) argued for the addition of ambivalence and Trafimow (2000) argued for the addition of habit to the TPB.

The majority of the papers did not strongly support the models being used either in terms of the expected associations between variables or in terms of the models ability to predict the designated outcome variable. But such data are not used to reject the model in question. Instead explanations are offered which function as caveats perpetuating the belief that the models have been verified. All data can be used to indicate the strength of a social cognition model but it would appear that no data can be collected to show that it is wrong. They therefore cannot be tested.

**Are the models testing analytic or synthetic truths?**

Philosophy of science differentiates between two types of truth - synthetic truth that can be known through exploration and testing and analytic truth that is true by definition. A good theory should generate synthetic rather than analytic truths to avoid being tautological. The large majority of papers correlated cognitions such as 'perceived behavioural control', 'attitudes', 'severity', 'susceptibility' and the 'costs and benefits of a behaviour' with the cognition 'behavioural intention'. At times the operationalisation of these different cognitions appeared very similar. For example, Lugoe and Rise (1999) correlated perceived behavioural control measured by the statement 'How certain are you that you would be able to use a condom at the next intercourse ...' with intentions which was operationalised as 'I intend to use a condom at the next sexual intercourse'. Similarly, the same two cognitions were operationalised by Masalu and Astrom (2001) as 'How easy or difficult will it be for you to avoid between-meal intake of sugared snacks and drinks in future' (p.439) and 'How likely or unlikely is it that you will avoid between meal intake of sugared snacks and drinks in future' (p.438) and by Rapaport and Orbell (2000) as 'Even if I wanted, I might not be able to provide practical assistance / emotional support for a parent of mine in need of care within the next twenty years' and 'If a parent of mine were in need of care within the next twenty years, I intend to personally provide practical assistance / emotional support' (p.314/5). If they are significantly correlated then is it really surprising? Such cognitions are defined as different and yet operationalised in similar ways. The majority of studies explored analytic truths which were true by definition rather than by exploration.

Many of these papers also correlated these same cognitions with a measure of behaviour. For example, Plotnikoff and Higginbotham (1998) assessed diet and exercise, Yzer et al (2001) assessed condom use and Conner, Sherlock and Orbell (1998) assessed ecstasy use. These



could be considered to be assessing synthetic truths as the cognition is operationalised differently to the behaviour. However, whilst one paper (Jones, Abraham, Harris, Schulz & Chrispin, 2001) assessed the reliability of their self reported behaviour, only a small minority of papers used an objective measure of behaviour which was not reliant upon self report (eg. Flynn et al, 1997; McClenden & Prentice-Dunn, 2001; Pakenham et al, 2000; Sheeran & Orbell, 2000; Sheeran, Conner & Norman, 2001). Such self reported behaviour could also be contaminated by the self reported cognitions and any association found between the two could also reflect a truth by definition rather than one which requires an empirical test.

### **Are they accessing or creating cognitions?**

All papers asked participants to complete a questionnaire to describe their cognitions. This procedure is based upon the assumption that the answers given will reveal pre-existing states of mind rather than ones which have been generated by the questionnaire. It is possible, however, that cognitions may be created simply by completing a questionnaire. This finds reflection in the use of questions to manipulate affect and cognition in both the cognitive and clinical literatures (eg. Wenzlaff & Wegner, 2000). This might be particularly the case if the behaviour being considered is novel and unfamiliar and is illustrated by several papers in the present sample. For example, Cecil, Pinkerton and Bogart (1999) used the HBM in the context of the female condom. However, 93% of their sample had never used a female condom and yet were asked to provide details of their attitudes towards them. Questionnaire statements such as ‘the appearance of the female condom turns me off’ (p. 170) and ‘female condom decreases sexual pleasure for a man’ might not be accessing such cognitions but creating them in this novice sample. Likewise Bagozzi, Lee and Van Loo (2001) explored decisions to donate bone marrow using the framework of the TRA. As a means of gaining

informed consent all participants were given a brief description ‘of the need for bone marrow donation’ which was introduced as follows: ‘Because most people are unfamiliar with bone marrow donation, we have prepared a short summary of the reasons for collecting bone marrow’ (p.38). Information was then provided ‘compiled from a variety of sources including publications from the National Marrow Donor Program’ (p.38). For many participants these may be novel areas for consideration and their cognitions may easily be manipulated. Such questionnaire items could create feelings of guilt and a sense of duty in the participant shifting their cognitions towards that which might seem more socially desirable. It may not however, only be novelty which can create a shift in cognitions. In line with the cognitive and clinical literatures (eg. Wenzlaff & Wegner, 2000) even focusing on a familiar behaviour could create a shift in cognitive set. Accordingly, completing questions about an individual’s cognitions may change and create rather access the way in which they think.

Completing a questionnaire may also change a participant’s subsequent behaviour. About half of the papers assessed behaviour at a follow-up time point. This methodological approach is considered appropriate if synthetic rather than analytic truths are being assessed. The process of completing a baseline measure of cognitions, may however, determine rather than simply predict subsequent behaviour. For example, Morrison, Baker and Gillmore (1998) asked teenagers to complete a range of cognitive measures based upon the TRA at baseline and then assessed their behaviour three months later. Although their subsequent behaviour was predicted by the earlier cognitions, completing items relating to their intentions to use condoms, their attitudes towards them and their perceptions of what their significant others thought about condoms, may have raised the salience of condom use, created a sense that this behaviour was socially desirable and therefore changed their subsequent behaviour.

Similarly, Masalu and Astrom (2001) asked a large sample of students to record their cognitions about consuming sugared snacks and drinks in line with the TPB. Items rated included ‘How likely or unlikely is it that you will avoid between meal intake of sugared snacks and drinks in future?’ and ‘Most people important to me think that I should avoid between meal intake of sugared snacks and drinks in the future’. They then assessed self reported consumption four weeks later. Baseline beliefs predicted behaviour at follow up. But they may also have raised the issue of between meal snacks and drinks and changed the participants’ behaviour.

## **Discussion**

This paper has explored the pragmatic and conceptual basis to a series of papers based upon four social cognition models. This analysis showed these models are useful and fruitful and provide a framework for the development of interventions designed to change health related behaviours. The models pass this paper’s criteria to assess their pragmatic basis.

The results from the analysis of their conceptual basis are less positive. Most papers using the social cognition models purport to ‘test’, ‘apply’ or ‘assess the utility’ of the model in question. In line with this, the majority of studies reported results which were not consistent with the predicted associations between constructs and / or left much of the variance in the outcome variable unexplained. However, rather than using this data to challenge the models a range of explanations were offered relating to the wording used, the population studied, the behaviour of concern or the need for additional variables. All data are used to support the models but it is not clear what data would enable the models to be rejected. Therefore they

cannot be tested. Further, most studies using the social cognition models assessed associations between constructs that were true by definition rather than by observation. This focus on analytic truths was illustrated by the multiple correlations between cognitions such as perceived behavioural control and behavioural intention but was also implicit within those associations between cognitions and self reported behaviour. Finally, although intending to measure an individual's cognitions the use of questionnaires based upon social cognition models may change rather than access the way a person thinks. Such a methodological approach may also change any subsequent behaviour. This problem seems particularly pertinent to the more recent interest in the relationship between intentions and behaviour and the intention behaviour gap (eg. Bagozzi, 1993; Gollwitzer, 1993). Researchers studying this area ask participants to rate their intentions to perform a particular behaviour such as taking vitamins, performing breast self examination and doing exercise (eg. Orbell, Hodgkins & Sheeran, 1997; Sheeran & Orbell, 1998). These data are regarded as illustrating and describing the respondents' views. Some researchers then ask respondents to describe when and where this behaviour will be performed in line with 'action plans' or 'implementation intentions' (eg. Orbell et al, 1997; Sheeran & Orbell, 1998;). This second set of data is considered an intervention as it has been shown to change subsequent behaviour. The first process of questioning is conceptualised as descriptive and as a method of data collection which elicits views. In direct contrast, the second process is conceptualised as manipulative and considered to change views. The process of making a participant construct an implementation intention is now promoted as one of the simplest and more powerful mechanisms for bringing about change (Sheeran & Orbell, 1998; 2000). This must also indicate that all question asking can also bring about change. It seems unlikely that the same process of question asking can be descriptive and passive for some of the time and

interventional and active at others.

To conclude, the present analysis indicates that social cognition models such as the HBM, PMT, TPB and the TRA can be considered pragmatic tools for health psychologists and researchers from allied research areas to draw upon. But in using them for this purpose the essential flaws in their conceptual basis should be recognised. These models cannot be tested, they focus on analytic truths rather than synthetic ones and may create and change both cognitions and behaviour rather than describe them and as such do not pass the criteria set for a 'good theory'. If they are to be given the status of theories then it is recommended that the critical eye that psychologists place upon other areas of research also be cast upon this one.

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