

Differential effects of mood on information processing: evidence from the theories of reasoned action and planned behaviour

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Abstract

The theories of reasoned action and planned behaviour continue to receive considerable research attention, despite criticisms of their 'asocial' conceptualisation and the rational decision-making approach. Two studies were designed to assess the impact of induced mood on condom use (Study 1) and food choice (Study 2). Both studies provided support for application of the theory of reasoned action to health-related behaviour, and for differential effects of mood on information processing. Study 1 provided support for problem-focus theory, with attitudes (but not subjective norm) predicting intention in the negative mood condition. The opposite pattern of findings held for the positive mood condition (i.e. only subjective norm predicted intention). The results of Study 2 provided further support for the problem-focus approach and for the inclusion of self-identity in the theory of planned behaviour. The findings are discussed with implications for future work on mood and behavioural decision making. Copyright © 1999 John Wiley & Sons, Ltd.

GENERAL INTRODUCTION

Mood has been shown to have a profound influence on both health (e.g. Futterman, Kemeny, Shapiro & Fahey, 1994; Weisse, 1992) and information processing (e.g. Forgas, 1994; Schwarz, 1990). Typically, however, the direct effects of moods on health (in particular, immune functioning) are considered (e.g. Weisse, 1992), to

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the detriment of more indirect effects (e.g. on health-related behaviour changes, Stroebe & Stroebe, 1995). This is of particular concern, given that the direct effects of mood on health are somewhat limited (e.g. immune system functioning). In comparison, the impact of preventive behaviours such as condom use and health-related food choice have a considerable impact on health (Department of Health, 1992). To date, investigation of social cognition models in conjunction with health-threatening behaviours has sought to delineate the principal cognitions underlying these behaviours (e.g. Conner & Norman, 1996). However, this work has remained isolated from research on the effects of mood on information processing. The main aim of this paper is to consider the role of mood on health-related behavioural decision making. There are three main reasons for this. First, it will allow examination of the indirect effect of mood on health. Interventions can be designed to induce positive or negative mood: knowledge of the effects of mood on cognition and behaviour is vital. Second, it affords the opportunity to address what have been damning critiques of the application of social cognition models. More specifically, Ingham (1994) has argued that social cognition models focus too closely on rational decision making alone, with no consideration of 'more social' factors. Consideration of mood goes some way to extending social cognition models beyond the realm of the individual as a rational information processor. Third, a seemingly separate tradition of social psychology has developed dual information processing models (e.g. Ajzen, 1996; Chaiken, 1980; Petty & Cacioppo, 1986). This has largely been ignored within the context of social cognition models, which imply that all information processing is uniformly rational (but see Fazio, 1990). As such, examination of the differential effects of mood on information processing within the context of social cognition models may allow integration of a larger body of research.

Evidence suggests that mood state impacts on individuals' information-processing capability. Briefly, it is thought that positive mood increases heuristic processing, whereas negative mood increases systematic processing. For example, Bless, Bohner, Schwarz, and Strack (1990) found that individuals in a positive mood were less persuaded by strong arguments than those in a neutral or mildly depressed mood (see also Bless, Mackie & Schwarz, 1992; Forgas, 1994). There are three main hypotheses to account for these mood effects on processing. First, Mackie & Worth (1989) suggested that positive mood limits cognitive processing capacity by priming positive thoughts in memory, which are more extensive and interconnected than negative or neutral thoughts. Second, Isen (1987) has argued that individuals seek to maintain positive mood, and will avoid exerting cognitive effort which is not directed at either maintaining or regaining positive mood. Third, Schwarz & Bless's (1991) motivational interpretation posits that negative moods signal problematic situations which require attention, cognitive resources and a depth of processing to avoid erroneous decision making. Positive moods signal that all is well with the world, encouraging risk taking, through the use of heuristic processing (for a review, see Schwarz, 1990). A recent study by Bless, Clore, Schwarz, Golisano, Rabe, and Wolk (1996) provides evidence to support the latter explanation. Bless *et al.* (1996) presented three studies which showed that in positive moods, people tended to use general knowledge structures (e.g. scripts); whereas in negative moods, individuals tended to adopt a more problem-solving approach. More succinctly, differences between processing in positive or negative moods is the difference between 'relying on general knowledge structures versus relying on the specifics of the situation' (Bless *et al.*, 1996, p. 666).

Although this paper does not directly address the proposed mediating processes, depending on which account of mood effects on cognition is correct, one would expect different influences on social cognition models. If mood influences cognitive capacity (either through memory or mood-repair effects), one would expect findings to reflect decreased cognitive capacity in a positive mood and increased capacity in a negative mood. Given that social cognition models are based on rational decision making, the effects would be analogous with dual process theories of attitude change (e.g. Chaiken, 1980; Petty & Cacioppo, 1986). That is, one would expect social cognition models to be more effective in a negative—as opposed to a positive—mood. One would therefore expect negative mood to increase the proportion of variance explained in the dependent variable (i.e. behaviour or behavioural intention). In contrast, positive mood should decrease the predictive power of such models. Alternatively, if mood influences problem-solving focus, one would expect similar amounts of variance in intention and behaviour to be explained, regardless of mood. One would, however, expect different variables to predict outcomes in each condition. More specifically, variables based on rational decision making (e.g. attitudes, perceived threat) would be expected to be more predictive in a negative mood than a positive mood. Congruent with this, variables based more on general knowledge structures (or rather, *less* on problem-solving or the ‘specifics of the situation’), or on less ‘reliable’ sources of information (e.g. norms, past behaviour) would be more predictive in the positive mood condition. This paper therefore considers the role of mood on information processing in behavioural decision making with respect to two health behaviours.

STUDY 1

Fishbein and Ajzen’s (1975) theory of reasoned action (TRA) is one of the most widely researched models of behavioural decision making in social psychology (e.g. Sheppard, Hartwick & Warshaw, 1988). The model posits intention as the proximal determinant of behaviour: the more an individual intends to perform a behaviour, the more likely will be its performance. In turn, intentions are determined by attitudes (overall positive or negative evaluations of behaviour) and subjective norms (general perceptions of social pressure). As a rational behavioural decision-making model, the roots of the TRA can be found in subjective expected utility and expectancy-value theory (e.g. W. Edwards, 1954; Peak, 1955). The behavioural beliefs which determine attitude are the product of beliefs about specific outcomes of a given behaviour, and the evaluation of those outcomes. At the same level of analysis, normative beliefs concern perceived social pressure from specific referents multiplied by one’s motivation to comply with those referents. Normative beliefs determine subjective norms.

Meta-analyses have shown that the TRA is a useful predictor of intentions and behaviour across a number of domains (see Sheppard *et al.*, 1988; Van den Putte, 1991). In spite of this, few attempts have been made to consider the TRA as anything other than a model of systematic decision making. For example, relationships between components may simply reflect systematic, as opposed to heuristic processing (cf. Chaiken, 1980; Petty & Cacioppo, 1986), or may be a function of questionnaire format (e.g. Budd, 1987). Indeed, there is evidence to suggest that amount of

concentration moderates the magnitude of component relationships in the TRA: greater concentration led to stronger component relationships (Ellen & Madden, 1990). One pervasive influence on processing strategy is mood: the aim of the present study is to consider the effects of mood on prediction of intention within the TRA. The first study focused on condom use: a behaviour which has been studied a number of times within the TRA framework (e.g. Fishbein, Chan, O'Reilly, Schnell, Wood, Beeker & Cohn, 1992; Fisher, 1984; Kashima, Gallois & McCamish, 1993).

Theories of mood and cognition suggest different effects of mood on information processing within the TRA. If mood influences cognitive capacity (either through memory or mood-repair), one might expect different amounts of variance in intention to be explained by attitude and subjective norm. More specifically, one would expect more of the variance in intention to be explained in the negative, as opposed to the positive, mood condition. Alternatively, if mood influences problem-focus, there should be differential prediction of intention. Given that attitudes are based on beliefs about the 'specifics of the situation' (cf. Bless *et al.*, 1996), one would expect attitude to be more predictive of intentions in the negative mood condition. In contrast, perceptions of social pressure are not focused on the behaviour *per se*, but the social pressure associated with the behaviour. In addition, reliance on normative influence to make a health-related decision is consonant with the increased risk taking hypothesised within the problem-focus approach. Within the TRA, one would therefore expect subjective norms to be more predictive of intentions in a positive mood; and attitudes to be more predictive in a negative mood.

Method

Sample

The sample consisted of 97 undergraduate students (35 male; 62 female), with a mean age of 21.19 years (range = 18 to 40). Participants were randomly allocated to positive ($n = 50$) or negative ($n = 47$) mood-induction procedure.

Materials

Positive or negative mood was induced in participants using Williams' (1984) modified version of the Velten (1968) mood-induction procedure (MIP). This consisted of 20 self-referent mood statements, designed to induce either positive (e.g. 'people really seem to like me') or negative (e.g. 'I have very little to look forward to') mood. The Velten (1968) MIP has been shown to be particularly useful for the induction of negative mood states (see Gerrards-Hesse, Spies & Hesse, 1994).

Mood Rating Scales

Bond and Lader's (1974) visual analogue scales were used to assess mood. The scales consist of 15 horizontal lines, 100 millimetres in length, with antonymous adjectives (e.g. alert-drowsy) on either pole. The mood scales have been validated

experimentally (e.g. Bond & Lader, 1974), and each item was attributed to 1 of 3 factors: 'alertness', 'contentedness', and 'calmness'. Principal components analyses (with Varimax rotation) produced three components at each point, accounting for between 64.1 per cent and 71.5 per cent of the variance. All scales showed sufficient internal reliability (Cronbach's alphas = 0.77 to 0.93).

TRA Questionnaire

Attitudes were assessed on six semantic differential scales. Respondents were presented with the sentence 'My using a condom is ...'. Six pairs of adjectives were rated, each on a 7-point bipolar (-3 to +3) scale: bad-good, beneficial-harmful, unpleasant-pleasant, enjoyable-unenjoyable, foolish-wise, and necessary-unnecessary. The mean of the six scales was taken as a composite score ($\alpha = 0.77$).

Subjective norm was measured on a 7-point unipolar (+1 to +7) scale: 'People who are important to me would (disapprove of me using condoms-approve of me using condoms)'.

Intention to use condoms was assessed using three items, each on 7-point bipolar (-3 to +3) scales. These were: 'If the situation arises during the next week, I intend to use a condom during intercourse (definitely do-definitely do not)', 'If the situation arises during the next week, I would want to use a condom during intercourse (strongly agree-strongly disagree)', and 'If the situation arises during the next week, I will use a condom during intercourse (likely-unlikely)'. The mean of these items produced a composite scale ($\alpha = 0.89$).

Procedure

The questionnaires were administered as a whole to groups which ranged in size from three to eight members, although participants sat alone for the duration of the experiment. Following an initial measure of mood, participants were instructed to read either the positive or negative mood statements. Specifically, they were advised to read the mood statements repeatedly, and to concentrate on the ones which were most personally relevant.

Following this 3-minute mood-induction procedure (MIP) a second measure of mood was taken. The second mood measure was followed by the first of five sections of the TPB questionnaire. After each section (which consisted of 14 to 17 items) there was a further 30-second MIP. The final MIP was followed by the final mood measure; in the elated condition, this marked the end of the experiment. For the depressed mood condition, a set of positive mood statements was provided, and participants were asked to concentrate on them until they felt suitably restored. Within the two mood conditions, the order of the items was reserved in half the questionnaires, in order to control for cumulative effects of exposure to the MIP.

Results

A MANOVA revealed significant effects of the MIP on all the mood scales ($F[3,93] = 7.27, p < 0.0001$). Univariate *F*-tests revealed that this effect was due to the

MIP specifically. For example, initial 'contentedness' did not differ between the groups ($F[1,95] = 2.73$, ns), but did following MIP ($F[1,95] = 33.29$, $p < 0.0001$), an effect which remained at the final mood assessment ($F[1,95] = 18.85$, $p < 0.0001$). This was confirmed by a significant within-subjects mood by time interaction for the 'contentedness' factor ($F[2,94] = 8.18$, $p < 0.001$); similar effects were found for all the mood scales.

Table 1 presents regressions of intention to use condoms on attitude and subjective norm, across the positive and negative MIPs. Although both regressions showed that TRA variables accounted for equivalent amounts of variance in intentions ($R^2 = 0.29$ for positive; $R^2 = 0.26$ for negative), there were differing patterns of prediction across the two conditions. For those individuals in the positive mood condition, subjective norm was the only significant predictor of intention. In the negative mood condition, only attitude significantly predicted intention. Using the Edwards (1984) procedure, the unstandardised beta coefficients were shown to differ significantly between the two conditions. Hence, for those in the negative mood condition, attitude-intention relations were significantly stronger than those in the positive mood condition ($t[93] = -1.94$, $p < 0.05$). Similarly, subjective norm-intention relations were significantly stronger for the positive MIP ($t[93] = 2.50$, $p < 0.01$) indicating a powerful effect of mood on cognition.

Table 1. Regression predicting intentions to use condoms, by MIP

Predictor	<i>R</i>	<i>R</i> ²	B	SE B	β
Positive MIP	0.53	0.29			
Attitude			0.12	0.24	0.06
Subjective norm			0.69	0.17	0.51***
Negative MIP	0.51	0.26			
Attitude			0.76	0.23	0.45**
Subjective norm			0.12	0.12	0.14

** $p < 0.01$. *** $p < 0.001$.

Discussion

Overall, Study 1 provides further evidence to support the application of the TRA to condom use intentions (see Fishbein *et al.*, 1992; Fisher, 1984; Kashima *et al.*, 1993). Perhaps more importantly, the findings from Study 1 illustrate differences between positive and negative mood effects on information processing. In contrast to theories which suggest that cognitive capacity is reduced by positive mood (e.g. Isen, 1987; Mackie & Worth, 1989), the present study found that equivalent amounts of variance could be explained in intentions across mood conditions. The implication is that the rational decision-making basis of social cognition models adequately accounts for the influence of mood on cognition. That is, contrary to predictions from cognitive capacity (e.g. Isen, 1987), similar amounts of the variance in intention could be explained by TRA variables, across both conditions.

The findings of Study 1 are congruent with Bless *et al.*'s (1996) position that negative mood signals the need for a problem-focused approach. Within the present study, the intentions of individuals in the negative mood were predominantly

determined by attitudes. In contrast, participants in the positive mood had significantly stronger subjective norm-intention relationships. In the context of Bless *et al.*'s (1996) problem-solving approach, negative mood leads individuals to focus on the specifics of a situation. Within the TRA, attitudes are based on beliefs about specific outcomes, multiplied by evaluations of those outcomes—the 'specifics' of the situation. In contrast, Bless *et al.* (1996) argue that individuals in positive moods are more prepared to make risky decisions; increased predictive utility of subjective norm in the positive MIP reflects this. First, subjective norms do not relate specifically to the behaviour in question, but to the perceptions of others. Second, basing an important health decision principally on normative influence may be regarded as being more risky than engaging in effortful decision making.

Study 1 therefore provides evidence to support the predictions of Bless *et al.* (1996), as opposed to cognitive capacity interpretations of the effects of mood on information processing (Isen, 1987; Mackie & Worth, 1989). A second study was designed to verify and extend the data presented in Study 1. More specifically, variables from Ajzen's (1991) theory of planned behaviour were incorporated into a similar design. In order to assess the extent to which the findings of Study 1 could be extended beyond condom use, Study 2 focused on another affect-laden behaviour: health-related food choice. This is of particular importance, given that Ajzen (1996) argued that behavioural intentions would be determined by different variables, depending on the nature of the behaviour.

STUDY 2

In spite of the considerable support for the efficacy of the TRA, the model is limited to prediction of volitional behaviours. In contrast, the theory of planned behaviour (Ajzen, 1988, 1991) represents '... a conceptual framework that addresses the problem of incomplete volitional control' (Ajzen, 1988, p. 132). Incorporating measures of perceived behavioural control (PBC) into the TRA framework extends the model to predict non-volitional behaviours. To the extent to which PBC reflects actual control, it is predicted to directly determine behaviour; further, the effort expended to perform a behaviour will increase with greater PBC (Ajzen, 1991). Congruent with the attitude and subjective norm components, underlying PBC is a set of control beliefs. True to the underpinnings of subjective expected utility theory, control beliefs are the product of perceived frequency of facilitating or inhibiting factors and the perceived power of those factors to facilitate/inhibit behaviour. This extension to the TRA is the theory of planned behaviour (TPB).

Within TRA/TPB research, the normative component has attracted criticism, and has been shown to be the weakest predictor of intentions (e.g. Van den Putte, 1991). More generally, authors have criticised models such as the TRA/TPB for understating the influence of culture and society on behaviour (e.g. Ingham, 1994; Potter & Wetherall, 1987).¹ A possible extension to the normative component was first suggested by Charng, Piliavin & Callero (1988). Charng *et al.* (1988) argued that the

¹Note that these criticisms run parallel with arguments that such models should be extended beyond pure rational decision-making research.

TRA (a point which can reasonably be extrapolated to the TPB) is compatible with identity theory. For example, both theories regard behaviour as being determined by conscious and intentional decisions, but differ in terms of focus. As such, identity theory embraces the wider social context, in particular the idea that individuals link behaviours to identifiable social characteristics or categories. In contrast, the TRA/TPB has a more restricted normative component, which deals solely with injunctive norms (see Cialdini, Kallgren & Reno, 1991). The self-identity construct reflects the way in which individuals view themselves within society, with respect to particular behaviours. Using meta-analysis, Conner and Armitage (in press) have shown that self-identity is an independent predictor of intentions, even controlling for TPB variables. This study therefore incorporates measures of PBC and self-identity to extend the data from Study 1.

The findings of Study 1 provided support for the impact of mood information processing within the TRA. In particular, the findings supported Bless *et al.* (1996) conclusion that mood exerts its influence on information processing, through problem orientation. Study 2 is essentially a replication of Study 1 with three major extensions. First, Study 2 assesses PBC and self-identity. PBC and self-identity have been shown to independently predict intentions, after controlling for TRA variables (see Conner & Armitage, 1998). Second, Study 2 measures behaviour prospectively: to assess mood influences on subsequent behaviour. Third, it extends the findings of Study 1 beyond condom use to health-related food choice. It is expected that the findings of Study 2 will parallel those of Study 1: negative mood will be associated with problem focus, whereas positive mood will be associated with more heuristic processing. More specifically, it is expected that self-identity will have a stronger association with intention in the positive mood condition: its more diffuse focus suggests it may be a more heuristic representation of normative influence. Similarly, given that Ajzen (1991) has argued that PBC will be relatively memory based (i.e. it is based on past experience or secondary information) it should also be more predictive in the positive mood condition. In terms of behavioural prediction, one might expect decisions based on systematic processing (i.e. in the negative mood condition) to be enacted.

Method

Sample

The sample consisted of 82 students, randomised either to positive ($n = 42$) or negative ($n = 40$) mood conditions. Of these, 19 were male and 63 were female. The mean age was 21 years (range = 18 to 41 years). Participants were asked to complete a measure of their behaviour 1 week following the initial questionnaire; behaviour measures are based on $n = 38$, a response rate of 46 per cent.²

²Analysis of responders versus non-responders produced no significant differences on any time 1 variables ($F[7,74] = 1.05, p = 0.40$). It was therefore assumed that time 2 respondents were a representative sample of time 1 responders.

Materials

Both the MIP and the mood rating scales were the same as in Study 1. Principal components analyses (with Varimax rotation) produced three components at each time point, accounting for between 67.3 per cent and 75.5 per cent of the variance. All mood-assessment scales showed sufficient internal reliability (Cronbach's alphas = 0.80 to 0.93).

TPB Questionnaire

Attitudes were assessed on six semantic differential scales. Respondents were presented with the sentence 'My eating healthily in the next week is ...'. Six pairs of adjectives were rated, each on a 7-point bipolar (-3 to +3) scale: bad-good, beneficial-harmful, unpleasant-pleasant, enjoyable-unenjoyable, foolish-wise, and necessary-unnecessary. The mean of the six scales was taken as a composite score ($\alpha = 0.81$).

The global measure of subjective norm was measured with a composite score derived from three items: 'People who are important to me think I (should eat healthily-should not eat healthily)', 'People who are important to me would (disapprove of my healthy eating-approve of my healthy eating)', and 'People who are important to me want me to eat healthily (likely-unlikely)'. All were measured on 7-point unipolar (+1 to +7) scales; internal reliability was adequate ($\alpha = 0.70$).

PBC was assessed with five items: 'Whether or not I eat healthily over the next week is entirely up to me (strongly agree-strongly disagree)', 'How much control do you feel you have over eating healthily over the next week? (complete control-no control)', 'For me to eat healthily over the next week is (easy-difficult)', 'I would like to eat healthily over the next week but don't really know if I can (strongly agree-strongly disagree)', and 'I am confident that I could eat healthy food over the next week if I wanted to (strongly agree-strongly disagree)'. These items were assessed on 7-point unipolar (+1 to +7) scales ($\alpha = 0.82$).

Intention to eat healthily was assessed using two items, each on 7-point bipolar (-3 to +3) scales. These were: 'I intend to eat healthily in the next week (definitely do-definitely do not)', and 'I plan to eat healthily in the next week (definitely do-definitely do not)'. The mean of these items produced a composite scale ($r = 0.78$, $p < 0.001$).

Self-identity measures were based on Sparks & Shepherd (1992): 'I think of myself as a healthy eater', 'I think of myself as someone who is concerned with "healthy eating"', 'I think of myself as someone who is concerned about the health consequences of what I eat', and 'I think of myself as someone who enjoys the pleasures of eating'. All self-identity measures were assessed using 7-point (+1 to +7) strongly agree-strongly disagree Likert scales ($\alpha = 0.71$).

One week later, follow-up measures were taken, which consisted of behaviour and mood scales. Behaviour was measured using a three-item self-perception of behaviour measure: 'I have eaten healthily in the last week (strongly agree-strongly disagree)', 'How often have you eaten healthily over the last week? (never-every-day)', and 'I have eaten more healthily *than usual* in the last week (strongly agree-strongly disagree)'. Cronbach's alpha for the behaviour measure was 0.70. Time 2 mood was measured using the same Bond and Lader (1974) instrument as at time 1.

Procedure

The procedure was identical to Study 1, except participants were contacted 1 week following initial assessment, in order to obtain a measure of behaviour.

Results

A MANOVA revealed significant effects of the MIP on all mood scales ($F[9,72] = 9.33, p < 0.0001$). Univariate F -tests revealed that this effect was due to the MIP specifically. For example, initial 'contentedness' did not differ between the groups ($F[1,80] = 0.19, ns$), but did following MIP ($F[1,80] = 50.60, p < 0.0001$), an effect which remained at the final mood assessment ($F[1,80] = 35.44, p < 0.0001$). This was confirmed by a significant within-subjects mood by time interaction for the 'contentedness' factor ($F[2,160] = 40.40, p < 0.0001$); similar effects were found for all the mood scales. Mood was assessed 1 week later to allow some assessment of the reliability of the scale.³ Comparisons between initial mood assessment and mood 1 week later revealed no significant differences on any of the scales ($F[6,31] = 0.41, ns$), showing that mood had returned to 'normal', and suggested the scale was reliable.

Congruent with Study 1, there were striking differences between mood conditions, particularly with respect to prediction of intention (see Table 2). In particular, attitude was a dominant predictor of intention in the negative mood condition. The difference in attitude–intention relationships between conditions was not significant, however. This study included measures of self-identity and PBC. The addition of self-identity—but not PBC—produced significant increments in the amount of variance explained. In the positive mood condition, self identity explained an additional 51 per cent of the variance in intention ($R^2\text{change} = 0.51, p < 0.001$); and 12 per cent in the negative mood condition ($R^2\text{change} = 0.12, p < 0.01$). In the final analysis, self identity was the only significant predictor of intention in the positive mood condition; for the negative mood condition, attitude and self-identity were independent predictors of intention. However, using the t -statistic, differences in the self-identity–intention relationships were found to be non-significant between conditions.

In order to assess the influence of mood on the TPB, the data were divided into positive and negative mood conditions, and subjected to a series of hierarchical regressions (see Table 2). Across both mood conditions, food choice behaviour was predicted by intention only, accounting for 30 per cent—39 per cent of the variance (R^2 's = 0.55, 0.62, for positive and negative MIP, respectively).

Discussion

This study provides support for the use of the TRA (as opposed to the TPB) in food choice research, given that PBC failed to independently predict intentions or behaviour. Self-identity, however was shown to play a central role in determining food choice, and may warrant inclusion within TRA/TPB (see also Conner & Armitage, in press). There was further evidence to suggest that mood state influences

³Although, as Bond and Lader (1975) point out, '... test–retest reliability is not feasible because the scale is not measuring a stable phenomenon or trait, but is a "here and now" rating of the subject's [sic] state' (pp. 214–215).

Table 2. Hierarchical regressions predicting intentions and healthy eating, by MIP

Step	Predictor	<i>R</i>	<i>R</i> ²	Increment to <i>R</i> ²	<i>F</i> for change	Final β
Prediction of behaviour						
Positive MIP Condition						
1	Intention	0.40	0.16	0.16	2.87	0.51*
2	PBC	0.55	0.30	0.14	2.84	0.39
Negative MIP condition						
1	Intention	0.54	0.29	0.29	7.72*	0.44*
2	PBC	0.62	0.39	0.10	2.89	0.33
Prediction of intention						
Positive MIP condition						
1	Attitude					0.19
	Subjective norm	0.39	0.15	0.15	3.45*	0.14
2	PBC	0.39	0.15	<0.01	0.22	0.17
3	Self-identity	0.82	0.67	0.51	57.40***	0.80***
Negative MIP condition						
1	Attitude					0.38**
	Subjective norm	0.66	0.44	0.44	14.57***	0.08
2	PBC	0.67	0.45	0.01	0.81	0.08
3	Self-identity	0.76	0.58	0.12	10.16**	0.50**

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

information processing with respect to behavioural decision making. In particular, self-identity was the only significant predictor of intention in the positive mood condition; whereas both attitude and self-identity independently predicted intention in the negative mood condition.

The effects of mood on the extended TRA component relationships were congruent with predictions derived from Bless *et al.*'s (1996) problem-focus hypothesis. In particular, attitude (problem-focus) was predictive of intention in the negative—but not positive—mood condition. Self-identity significantly predicted intentions in both conditions, but was the only predictor in the positive mood condition, and accounted for a proportion of the variance equivalent to the negative mood condition. Self-identity may be regarded as a diffuse measure of normative influence, representing a number of normative influences (Charng *et al.*, 1988). As such, self-identity may act as a general knowledge structure (cf. Bless *et al.*, 1996; Schwarz & Bless, 1991); or an heuristic (cf. Chaiken, 1980; Mackie & Worth, 1989). This showed that participants in a positive mood were more likely to base their health decision on self-identity, a finding which may reflect more heuristic processing and a willingness to base decisions on less reliable sources. Congruent with this interpretation, self-identity was the only determinant of intention in the positive mood condition. In contrast, for the negative mood condition, intentions were determined by both attitude and self-identity. This supports the argument that negative mood prompts a more systematic, problem-specific approach, given that attitudes are based on expectancy-value theory within the TRA/TPB. These effects therefore reflect the problem-focus approach and the findings of Study 1.

Congruent with previous research, this study found a role for self-identity within the TPB. The diffuse nature of the self-identity construct means that it may capture social determinants of intentions and behaviour which are currently not included in the TPB. There are a range of normative components which may have been tapped by

our measures of self-identity. Such variables include personal norms (e.g. Parker, Manstead & Stradling, 1995), perceived need (Paisley & Sparks, 1998), and descriptive norms (Cialdini *et al.*, 1991; Conner, Martin, Silverdale & Grogan, 1996), all of which have shown predictive validity within TPB. These variables may prove more amenable to change than self-identity (e.g. Parker, Stradling & Manstead, 1996). Further research may therefore need to assess evidence for discriminant validity between self-identity and these other variables.

GENERAL DISCUSSION

The two studies presented here provide further evidence to support the application of the theories of reasoned action and planned behaviour to condom use and food choice. Moreover, there was evidence to support an effect of mood on information processing. As such, this paper goes some way to addressing criticisms of the TRA/TPB, which argue that the models are too reliant on rational decision making and individualistic influences on behaviour (see Ingham, 1994; Potter & Wetherall, 1987).

Three main theories of mood and cognition have been proposed to account for the effects of mood on information processing: memory effects (Mackie & Worth, 1989), mood-repair (Isen, 1987), and problem signalling (Schwarz & Bless, 1991). The findings of both studies are congruent with the Schwarz and Bless (1991) approach, that negative mood signals need for problem solving, whereas a positive mood signals that all is well with the world. In both studies, attitudes were strong predictors of intentions in negative mood state. Given that attitudes are determined by behavioural beliefs (i.e. expectancy-value theory) this suggests that individuals in a negative mood focus relatively more on specific outcomes and other attributes associated with behaviour when making their decisions. This is reflected in the superior prediction of intention from attitude in both negative mood conditions.

Positive mood promotes risky decision making and/or more heuristic strategies, and both studies provided support for this. In the first study, subjective norm was the only predictor of intention in the positive mood condition; self-identity was the only significant predictor of intention in the second study. Basing a health-related decision on subjective norms may be regarded as a relatively risky option, which avoids the problem-specific focus of attitudes. Similarly, self-identity reflects general knowledge structures, thus supporting the argument that more heuristic or general knowledge-based decisions will be made in a positive mood. These findings therefore clearly map onto those of Bless *et al.* (1996).

The two studies reported here have far-reaching implications for studies involving the TRA and TPB. There are two points in particular we would like to raise. First, the TRA and TPB are models based on the assumption that individuals engage in uniformly rational decision making. The present studies, however, show that differences in information processing can radically alter component relations. This work therefore maps onto the seemingly separate tradition of attitude research which has shown that differences in information processing are important for attitude change (e.g. Chaiken, 1980; Petty & Cacioppo, 1986). The implication is that models such as the TPB should be extended to account for such information-processing effects. In so doing, this may go some way toward accounting for critiques of the approach (e.g. Ingham, 1994).

Second, several authors have noted that the subjective norm component of the TRA rarely predicts intention (e.g. Conner & Armitage, 1998). Researchers have attempted to explain this by considering additional normative variables (e.g. Conner *et al.*, 1996), or by arguing that the behavioral intentions of certain individuals may be relatively 'subjective normatively'—led (see Trafimow & Finlay, 1996). The present studies point to an alternative explanation, the roots of which can be found in critiques of the use of questionnaire data in social psychological research (see Budd, 1987). In both studies, attitudes were significant predictors of intention in the negative mood conditions. This provides evidence for systematic processing. Crucially, in a typical TRA/TPB study, individuals are presented with a questionnaire which they are instructed to complete alone or with minimal distraction. As such, the participant is encouraged to focus their attention on the questionnaire, meaning that completion of the questionnaire receives considerable amounts of the individuals' total processing capacity. The dominance of attitude as a predictor of intention may therefore reflect increased processing resources during questionnaire completion. To use the terminology of Ajzen (1996), when individuals are presented with a TRA/TPB questionnaire, they are likely to be in a deliberative (as opposed to spontaneous) mode of thought. This study manipulated allocation of processing resources using mood, therefore attitudes were only predictive of intention when processing was facilitated by negative mood. Note that this provides support for the argument that questionnaires do not provide a neutral tool for data collection (see Budd, 1987). Moreover, this may have implications for the implementation of intentions. Ajzen (1996) has argued that intention-behaviour correspondence will be increased by congruity in mode of processing. For example, intentions formed in a deliberative mode are more likely to be acted upon if the individual is in deliberative mode at the time of enactment. Hence, assessing mode of processing during questionnaire completion may potentially lead to greater intention-behaviour consistency (cf. Fazio, 1990). Therefore, one way to extend the work of this study may be to employ Fazio's (1990) response latency methodology, in order to allow some assessment of mode of processing. This may shed light on the dominance of attitudes as predictors of intention within TPB research.

These studies therefore provide support for the efficacy of the TRA in predicting condom use and food choice intentions and behaviour. Self-identity was shown to be a useful predictor of intentions within the TPB. Mood state clearly influences behavioural decision making with further support for the problem-focus approach (Bless *et al.*, 1996). The effect may therefore be useful in more applied contexts, although further research needs to address mood and information processing effects on other models of behavioural decision making. Perhaps most urgent, however, is the need to develop adequate direct measures of amount of processing, given that this has been proposed as the important mediating variable.

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