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The Theory of Reasoned Action and Its Application to Understand the Relationship between Attitudes and Behaviours: An Introduction and a Review

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Project R7958: Developing supportive policy environments for improved land management strategies - Nepal

The Theory of Reasoned Action and Its Application to Understand the Relationship Between Attitudes and Behaviours: An Introduction and a Review

By
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C O N T E N T S

1 Introduction

This document provides a review of the attitude and behaviour theory which is being used as the main theoretical construct to guide the work on the project.

The material presented here is organised into five chapters. The second chapter deals with the fundamentals of the Theory of Reasoned Action (TORA). All the major ideas and concepts that constitute the Theory of Reasoned Action are treated critically, explaining their meaning and their strengths and weaknesses whenever they have been applied in various studies on understanding the relationship between attitudes and behaviour. The third chapter is an extension of the previous one as it highlights the main features of the studies that are relevant to the project at hand. The fourth chapter has attempted provide an illustration of how the Theory of Reasoned Action construct is applied by using one recently completed study and another one still underway. In the final chapter a bibliography on the subject is provided.

2 The Theory of Reasoned Action

Introduction

Research on the relationship between attitudes and behaviour has developed rapidly since the late 60s. One particular set of ideas and theoretical constructs has come to dominate such research into attitude-behaviour relationships and behavioural change, termed collectively as the Theory of Reasoned Action (TORA) (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980). The application of TORA is believed to have restored " … confidence in the utility of attitudes as a predictor of behaviour; they form the basis for a conceptualisation of the … causal links between attitudes and the behaviour …" (Eiser, 1984, p. 61).

Most reviews of the attitude-behaviour research recognise the explanatory and predictive powers of the TORA, as empirical evidence to support that view has accumulated drawn from both experimental and natural settings (e.g. the reviews of Ajzen and Fishbein, 1980; Canary and Seibold, 1984; Chaiken and Stangor, 1987; Cooper and Croyle, 1984; Eiser, 1986; Feather, 1982; Olson and Zanna, 1993; Randall and Wolff, 1994 Sheppard, Hartwick and Warshaw, 1988; Sparks et al., 1991; Tesser and Shaffer, 1990). The TORA has now become the principal theoretical construct for both the study and prediction of volitional behaviour.

The TORA has essentially been derived from some social-psychological concepts and it was first put forward by Fishbein (1967) as a multi-attribute model of attitudes in the context of marketing research. It was later extended in cooperation with Azjen (see Fishbein and Azjen, 1975) culminating in the publication of a definitive book on the subject (Ajzen and Fishbein, 1980).

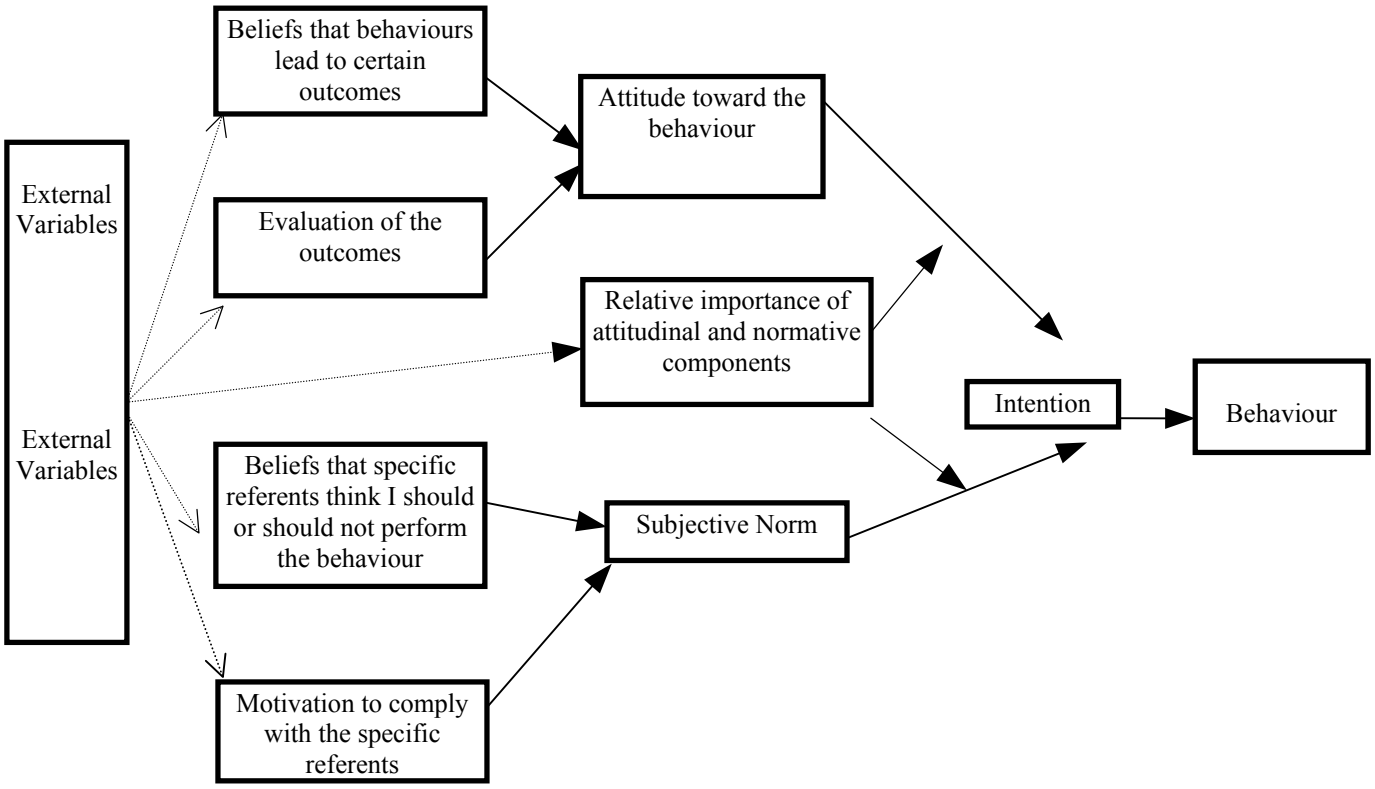
Definition

“As the name implies, the theory of reasoned action is based on the assumption that human beings usually behave in a sensible manner; that they take account of available information and implicitly or explicitly consider the implications of their actions ... the theory postulates that a person’s intention to perform (or not perform) a behavior is the immediate determinant of that action. Barring unforeseen events, people are expected to act in accordance with their intentions” (Ajzen, 1988, p.117).

The theory claims that the immediate antecedent of any behaviour is the intent to perform that behaviour. The stronger the intention, the more the person is expected to try and therefore the greater the possibility that the behaviour will actually be performed (Ajzen and Madden, 1986). The theory is therefore primarily concerned with identifying the factors underlying the formation and change of behavioural intent (Fishbein and Manfredo, 1992). Intention is often treated as the dependent variable under the influence of two independent determinants - the attitude and subjective norm- related to the behaviour in question …" and "… are assumed jointly to determine behavioural intention” (Ajzen and

Madden 1986, p.454). A person's intention to behave in a certain way is therefore based on: their 'attitude' toward the behaviour in question; their perception of the social pressures on them to behave in this way, termed 'subjective norms'. The relative contribution of attitudes and subjective norms may vary with the context and the individual. Attitudes are determined by the beliefs about the outcomes of performing the behaviour and the evaluation of these expected outcomes. The subjective norm is dependent on beliefs about how others feel the individual should behave and their motivation to comply with these 'others'(Ajzen and Fishbein, 1980; Carr, 1988, p. 33). The components that make up the TORA are summarised in the diagram below.

Figure 1. The Theory of Reasoned Action (Ajzen and Fishbein 1980)



The TORA is best understood (Fishbein and Manfredo, 1992, pp.30-31) as a series of hypotheses linking (i) behaviour to intentions, (ii) intentions to a weighted combination of attitudes and subjective norms, and (iii) attitudes and subjective norms to behavioural and normative beliefs. These hypotheses are represented in Figure: 4.1. above by the solid arrows between the adjoining boxes. If one accepts the causal chain illustrated in the diagram, it follows that behaviour is ultimately determined by one's underlying beliefs. Changing behaviour is therefore primarily a function of changing this underlying cognitive structure. The factors such as personality characteristics, demographic variables, social role, status, kinships patterns are important but do not bear any direct relationship in this cognitive structure of the TORA.

The strength of the relationship between the variable constructs within the theory are measured using the correlation coefficient analysis. The multiple correlation coefficient (R) serves as an index of the extent to which behavioural intention can be predicted from the simultaneous consideration of attitude and subjective norm. In computing (R), weights (w) representing the contributions of attitude and subjective norm towards the prediction of the behavioural intention are obtained. These weights are indicative of the relative importance of the variables' contribution to the prediction of intention (Ajzen and Fishbein, 1980; DeBarr, 1993, pp.6-7) and thus the measurement of the relationship between attitudes and behaviour can be specified as:.

$$\mathrm{A} = \sum_{i=1}^{n} b_i e_i \text{ and } \mathrm{SN} = \sum_{j=1}^{n} b_j m_j \text{ so that } \mathrm{B} \cong \mathrm{BI} = \mathrm{A}w_1 + \mathrm{SN}w_2 \qquad (1)$$

Where **A** is attitude toward the behaviour, $\mathbf{b_i}$ is a belief about the likelihood of outcome **i**, $\mathbf{e_i}$ is the evaluation of outcome **i**, **n** is the number of salient beliefs, **SN** is the subjective norm, $\mathbf{b_j}$ is a normative belief (that the reference group or individual, **j** , thinks the person should or should not perform the behaviour), $\mathbf{m_j}$ is the motivation to comply with referent **j**, **B** is the behaviour, **BI** is the behavioural intention and w_1 and w_2 are the empirically determined weights (Carr, 1988, p.33).

Behaviour

A clear distinction is drawn between the actual behaviour and the outcome of that behaviour. The actual outcome of the behaviour may be dependent on many other factors besides the specific behaviour in question. Therefore, according to Ajzen and Fishbein (1980: 30), measuring outcomes is not the same as measuring behaviour. What is observed or recorded is the instance of behaviour, not the impact of it. It is the behaviour rather than the goal of that behaviour that the TORA claims to predict.

To apply the theory one has to first identify the behaviour(s) of interest. How these behaviours are identified and defined is important to the future structure of the enquiry and the subjects' responses. The behaviour(s) can be drawn out from the subjects through open elicitation, identifying those activities they most associate (salient) with the topic or issue under study. This will help insure that the behaviours chosen are considered relevant and of interest to the subjects. In practice however, behaviours are often pre-selected by the researchers.

Congruence

In identifying the behaviour, four elements -action, target, context and time- need to be taken into account. These help set the parameters for congruence with the corresponding determinants, i.e. every

action occurs with respect to some target, within a given context, and at a given point in time. These help set the degree of generality or specificity of the behaviour. As the behaviour changes, so do its determinants, and as these change so different interventions may become the most appropriate (Fishbein and Manfredo, 1992, p.31). The importance of being able to ensure the same degree of correspondence between the behaviour of interest and its determinants is central to the TORA. The wording of the relevant questions and attention to timing are the principal mechanisms of achieving congruence between the behaviour and its determinants -intention, attitude, attitudinal beliefs, subjective norm and normative beliefs (Sheppard et al. 1988).

Volitional Behaviour and Control.

The TORA is considered most appropriate to the understanding and prediction of volitional behaviour (Ajzen, 1975). Conversely, as Ajzen and Madden (1986) state, the more the performance of the behaviour is contingent on the presence of appropriate opportunities or access to adequate resources the less the behaviour is considered to be under volitional control. Ajzen (1985, 1988) in his explanation of an extension of TORA, the Theory of Planned Behaviour (TOPB), suggests that where the behaviour may not be under the complete control of the subject, the theory is enhanced by the inclusion of a third variable, 'perceived behavioural control' -the person's belief about how easy or difficult the performance of the behaviour is likely to be. A volitional behaviour is one that is considered to be within the capability of the subject to perform with relative ease if so inclined (Ajzen, 1988, p.112), or a behaviour that the individual can decide at will to perform or not perform (Ibid, p.47). The TORA explains and predicts most types of social behaviour if its boundary mechanisms are respected. The volitional nature of the behaviour in question is one of these (Sheppard et al., 1988).

Specific Behaviours and Behavioural Categories / Domains.

The degree of specificity or generality is dependent on the behaviour in question. Very specific behaviours may consist of a single act, such as felling a tree, while a general behaviour, deforestation, could also be considered a single behaviour (McKemey, 1996).

Behavioural categories are made up of sets of activities, or aggregates. These different activities can be isolated and individually presented to the subject. Behavioural categories cannot be directly observed, instead they are inferred from single actions assumed to be instances of the behavioural category. The observation of one act will rarely provide an adequate measure of the category in question, and it is therefore necessary to observe a set of single actions and combine them in a general measure, i.e. a behavioural index (Ajzen and Fishbein, 1980; Ajzen 1987). Ajzen (1987, p.15) referring to various studies that had addressed the problem of attitude-behaviour inconsistency, demonstrated stronger associations between general measures of attitude and aggregate or multiple-

act indices. Bagozzi (1981, p.608) as quoted in Cooper and Croyle (1984, p.398) observed that: "A general attitude will predict a multiple-act criterion better than a single act criterion, whereas a single specific attitude will predict a single act criterion better than a multiple act criterion". Ajzen (1987) draws attention to the fact that not all behaviours can be combined within a multiple-act measure based on their apparent ability to reflect the same disposition or face validly. Where a multiple-act measure is developed to represent the *subjects'* action associations with a particular behavioural category, these acts should be selected by means of acceptable psychometric procedures so as to guarantee a common variance and thus be indicative of the same underlying disposition (Ibid, p.17).

Measurement of Behaviour

Behaviour is usually measured at some appropriate period after the measurement of intent. However, the instance of past or persisting behaviour can also be read in the same fashion at the time of reading future intent. The usual criterion of measurement is whether or not the intended behaviour took place within its pre-defined elements, in a yes or no response format.

The measurement of behaviour is usually dependent on self-reports, although, if the action is appropriate, direct observation can be used. Ajzen and Fishbein (1980) claim self-reports are usually quite accurate, a claim supported by other researchers as well (e.g. Katz, 1984). Self-reports have various advantages; in particular, they permit the defining of the four behavioural elements (that is action, target, context and time) at any level insuring congruence between the stated intent and the measured behaviour (Ajzen and Fishbein, 1980, p.39).

Predicting Behaviour from Intentions

The volitional control assumption implies that intentions must correspond directly with the behaviour in terms of action, target, context and time. Considerable research demonstrates that, when properly measured, correspondent intentions are very accurate predictors of most social behaviour (e.g. the reviews of Ajzen, 1977; Ajzen and Fishbein, 1980; Cooper and Croyle, 1984 and more recently Sheppard et al., 1988; Olson and Zanna, 1993). The primary concern is with identifying the factors underlying the formation and change of intent (Fishbein and Manfredo, 1992, p.33).

Stability of Behavioural Intentions

The stability of intention over time has been a constant issue, as intentions are assumed to become stable over time. The resulting behaviour therefore needs to be measured as soon as possible after the recording of the intention. Clearly if the period of time between measuring intent and observing the behavioural response is too short it would tend to invalidate the exercise, as the time gap between the two measurements would not permit an intervention based on the acquired knowledge of the intent

and its determinants. However, an understanding of the behaviour and those factors that have determined the decision to perform it can also be applied to future educational interventions, beyond the intention-behaviour (I-B) measurement time span.

The issues related to the stability of intentions themselves and the ability to forecast those behavioural intentions in the long term were addressed by Ajzen and Fishbein (1980, pp.48-49) in two ways. First, they claim that aggregated intentions are apt to remain much more stable over time than are individual intentions. The long-term predictions are not therefore concerned with the behaviour of a given individual but with behavioural trends in segments of the population. Second, they recommend the introduction of conditional suggestions when eliciting intentions over the long term. Conditioning intentions, whether individual or aggregate, will tend to improve their stability over time.

Measurement of Behavioural Intent

Intention can be measured as a response to one specific behaviour, or intention indices can be developed, similar to behavioural indices, when dealing with sets of behaviours representing behavioural categories. Intention is measured by asking how probable or improbable or likely or unlikely the individual feels it is that they will perform the particular behaviour, defining the descriptive elements within the question (Ibid, pp.42-43). The response is usually measured on a Likert like, a semantic differential and a bipolar scale of between five to nine intervals (Ibid, p.261). Both Carr (1988) and Doll and Orth (1993) measured intention using statements of likelihood and probability in the same measure. It is suggested that this, to a degree, also takes into account the concept of perceived control regarding the execution of the behaviour, though not the outcome.

The question has been raised whether intentions or expectations are being measured and which of these is more predictive of future behaviour. Various studies have found expectations to be the stronger predictor of behaviour (Sheppard et al., 1988; Gordon, 1989 in Olson and Zanna, 1993). Warshaw and Davis (1985), who are among the first set of researchers to have addressed this issue, demonstrated the greater predictive power of expectations over intention.

The TORA however concentrates on the volitional behaviour and thus it is the behaviour and not the outcome of the behaviour that intention refers to within this model. The research by Warshaw and Davis (1985) and Gordon (1989), and Randall and Wolf's (1994) meta-analysis tested the hypothesis that expectation measurements of intention would be more resilient over time than behavioural intention measures. They did not find support for this hypothesis. They suggest that the TORA intention-behaviour relationship will prove more robust over time than the other competing models.

The importance given to outcome or behaviour is dependent on the nature of the study being undertaken. Although the theory is concerned with behaviour, they note that where a person's behaviour controls certain outcomes, it is also relevant for the prediction and understanding of these outcomes (Ajzen and Fishbein, 1980, p.30) as it is the outcome, which is the principal focus.

However, one should note that generally people do not intend to perform behaviours which they realise are beyond their abilities Fishbein and Ajzen (1975, p.372). Warshaw and Davis (1985) recognise that the distinction between intention and expectation is not significant where the behaviour is under volitional control. The ability to identify the difference between intention and expectation could help to identify the actor's perception of volitional control. In situations where description of the behavioural decision process is of interest this information could help verify the outcome beliefs and give further indication of the 'certainty' of the expressed intentions. It has been shown that where intentions are more certain, they are better predictors of behaviour (e.g. Nederhof, 1989 in Olson and Zanna, 1993; Pieters and Verplanken, 1995). Similarly, the findings of Sheppard et al. (1988, pp.336-337) appear to support the use of intention rather than expectation in applying TORA.

Predicting Intentions from Attitudes and Norms

"Generally individuals will intend to perform a behavior [sic] if they have a positive attitude towards the behavior [sic] and when they believe their significant others think they should perform it." (Fishbein and Manfredo, 1992, p.34). The determinants of intention are personal and social, expressed in the attitude and subjective norm. The attitude and subjective norm, as specified by the TORA, are governed by the individual's cognitive response toward his/her own carrying out of the behaviour in question. The importance of correspondence between the intention and the expressed attitude and norms is emphasised.

Attitude Measurement

An attitude toward any concept is simply a person's general feeling of 'favourableness' or 'un-favourableness' towards anything and it represents a positive or negative evaluation of performing the behaviour (Ajzen and Fishbein, 1980, p.54). One of the most persistent definitions of attitude describes it as a tripartite construct consisting of cognitive (beliefs, facts, principles, knowledge, or understanding); affective (emotion, feeling, or emotional evaluation); and conative (behavioural tendency or intent) components (Gray, 1985, p.22). The definition of attitude remains an issue of debate (e.g. see the reviews of Tesser and Shaffer, 1990; Olson and Zanna, 1993). According to Olson and Zanna (1993, p.119) "Despite a long history of research on attitudes, there is no universally agreed-upon definition." Attitude tends to be defined in terms of evaluation, affect, cognition and behavioural predisposition. However, it would appear that there is some consensus on the following: that evaluation constitutes a central aspect of attitudes; that attitudes are represented in memory; that affective, cognitive and behavioural antecedents of attitudes can be distinguished, as can affective, cognitive and behavioural consequences of attitudes (Olson and Zanna, 1993, p.119).

The measurement of attitude in the TORA model can involve many of the standard scaling procedures. The one most frequently applied within the TORA model is the semantic differential scale (Osgood, Suci and Tannenbaum, 1957). This involves the individual checking a series of semantic differential, evaluative bipolar scales. The sum of these scales is taken to represent the attitude. Alternatively, the respondent could be asked to provide a single, direct indication of his/her attitude by responding to a single scale differentiating between degrees of favourable or unfavourable evaluation of the behaviour in question. The objective of the different methods is to achieve a single quantitative measure of attitude (Ajzen and Fishbein, 1980, p.55). It is however recognised that the definition of attitude as a bipolar evaluation does not capture the full complexity that has come to be associated with the attitude concept. Attention is drawn to the widespread recognition of the evaluative function as the most essential part of an attitude and therefore to the justification for the claim that this definition does justice to the attitude concept (Ibid. p.55).

Subjective Norm Measurement

The subjective norm deals with the influence of the social environment on intentions and behaviour and are defined as 'socially agreed upon rules, the definition of what is right and proper' (Webster, 1975, p. 16 in Ajzen and Fishbein, 1980, p.57). Loomis (1960) states that the norm involved in a given activity or relationship is the most strategic element in the understanding and prediction of action; they are the basic element of the social system, patterning such activity as knowing, feeling, dividing functions and allocating status-roles, controlling, ranking, and sanctioning. "Norms are the 'rules of the game'; norms are more inclusive than written rules, regulations, and laws; they refer to all criteria for judging the character or conduct of both individual and group actions in any social system … [and as such they are] … the standards determining what is right and wrong, appropriate and inappropriate, just and unjust, good and bad in social relationships" (Ibid. p.17). Norms can relate to external facets or obligations of and to the social system or they can be more internal in nature. The TORA is more restrictive in defining social norms, as it regards the subjective norm as referring to a specific behavioural perception attributed to a generalised social agent. The social norms is the respondent's perception of important others regarding their, the subject's, carrying out or not-carrying out of a specific behaviour. This perception may or may not reflect what these important others actually think (Ajzen and Fishbein, 1980).

The subjective norm can be measured by soliciting a response to the question of how much the subject believes the people who are important to them would, or would not, wish them to perform the behaviour on a bipolar scale of similar gradient to that applied to the measurement of attitude. Correspondence between the subjective norm and the behaviour remains important, just as with the intention-behaviour relationship.

The Differential Influence of Attitudes and Subjective Norms

In the TORA intention is determined by the sum of both the attitude and subjective norm readings, each weighted to indicate their level of influence on the expressed behavioural intention, as represented in the specifications set (1) as defined previously. Many applications of the TORA have demonstrated the independent relationship of attitudes and norms to intention and the mediating role of intention (e.g. reviews of Chaiken and Stangor, 1987; Cooper and Crolye, 1984; Eiser, 1984; Olson and Zanna, 1993; Sheppard et al., 1988). Jaccard and Davidson (1972) in a study of family planning behaviour found that, as the TORA suggests, attitude and subjective norm correlate more strongly with intention than with each other. This has generally been shown to be the case (e.g. Budd and Spencer, 1984), although some research such as Norwich and Jaeger's (1989) study of mathematics learning behaviour questioned this relationship, showing that the attitude and subjective norm can have a direct influence on each other. Likewise Grube et al. (1986) have also questioned the independence of attitudes and norm from each other pointing out that the attitudinal and normative components are multidimensional, involving different spheres of influence (e.g. peers, parents or siblings, in the case of subjective norms). It could be argued however that this issue is addressed by respecting the principle of correspondence between the behaviour in question, intention and its different components in the application of the TORA.

Eiser (1984, p.62) states that one of the most helpful contributions of the TORA is the attention directed to the relative contributions of attitudinal and normative factors as predictors of intent. The ability to identify whether people pay greater attention to their personal evaluation of benefit or to the approval or disapproval of others with regard to a particular behaviour can have 'considerable practical relevance' in the targeting of future interventions. Fishbein and Manfredo (1992) point out that the relative importance attached to either the attitude or the norm can vary from behaviour to behaviour or from individual to individual, or with changes in the context of the behaviour (Eiser, 1984). This 'attitude-subjective norm' relationship to intention is sensitive not only to external contextual variables, but also to internal or cognitive variables like knowledge, prior experience, effort, moral obligation and perceived behavioural control. Apparently slight variations in the behaviour under investigation can have important effects upon whether the attitude or subjective norm is more influential.

The Determinants of Attitudes

Ajzen (1988, p.118) points out that for many practical purposes an identification of the attitude and subjective norm and their relative importance may be sufficient to account for the intention. However, for a more complete understanding of intentions it is necessary to explore why people hold certain attitudes and subjective norms, which involves the identification of the behavioural and normative

beliefs. Fishbein and Manfredo (1992, p.38) explain that the theory views behavioural change as a matter of changing the cognitive structure of behavioural beliefs and evaluations underlying specific attitudes as well as identifying, examining and adjusting the cognitive structure of normative beliefs and motivations to comply, which determine the subjective norm to the same behaviour. Beliefs therefore ultimately first determine both intention and behaviour and then underlie both attitudes and subjective norms concerning outcomes (Ajzen and Fishbein, 1980, p.62).

Behavioural Beliefs

The attitude toward carrying out a specific behaviour is a function of the person's salient beliefs regarding the outcome or consequences of this behaviour and the evaluation they attribute to these expected outcomes. The more one believes that the action will lead to positive outcomes or prevent negative ones, the more favourable one's attitude, and vice versa (Fishbein and Manfredo, 1992). In order to determine an attitude, therefore, it is necessary both to identify and measure the subject's salient outcome expectations and their respective attributed values. The combination of the outcome expectation strength (that is how likely or unlikely the outcome is) and its evaluation (that is how good or bad the expected result is) make up a behavioural belief.

Measurement of Behavioural Belief

The sum of the salient behavioural beliefs regarding the subject's carrying out of the behaviour in question is the predictor of attitude. Both expectation and evaluation are measured on a bipolar scale similar to that recommended for the measurement of intent for each behavioural belief.

It is recommended that bipolar rather than unipolar scales are used for the measurement of all the variables of the TORA model apart from behaviour and 'motivation to comply'. When measuring modal salient beliefs it would be inappropriate not to present the opportunity for the subject to indicate if the statement is in their view false (Ajzen and Fishbein, 1980, p.71); however, unipolar scales are recommended for the measurement of 'personal salient beliefs' (Ibid. pp.66-67), for how can someone state that their personal salient belief is false?

There has been some concern expressed within the literature regarding the method of scoring beliefs within expectancy-value models. Both unipolar and bipolar instruments have been applied. In analysing the empirical findings from a series of studies, Sparks, Hedderley and Shepherd (1991, p.261) found "... that [a] bipolar scoring of 'belief' items leads to higher correlation of the summed products of beliefs and evaluations with attitudes than are achieved with a unipolar scoring. " and they note that "... under a unipolar method of scoring beliefs one is faced with the awkward consequence that disbeliefs in negative outcomes contribute negatively towards attitude (e.g. $+1 \times -3 = -3$) and disbeliefs in positive outcomes contribute positively towards attitudes (e.g. $+1 \times +3 = +3$)." Similarly

Kiely-Brocato et al. (1980) draw attention to the danger of treating non-beliefs as negative disbeliefs. However, the essence of the problem is that a disbelief statement does not indicate what is believed and what is believed is crucial to the TORA.

Different applications of the TORA use different number of intervals on the scale of measurement. Ajzen and Fishbein (1980, p.263) recommend seven intervals on both unipolar and bipolar scales. However, the value of presenting large numbers of intervals has been questioned (Likert, 1932) and scales of five intervals have been used successfully (e.g. Carr, 1988) in the application of the TORA. When dealing with respondents who do not naturally manipulate numeric valuations regarding non-tangible issues such as attitudes and beliefs, or express them within a long sequence of adjectives, it may be detrimental to present these unnatural methods and degrees of expression within the elicitation instrument.

Salient Beliefs

A salient belief is what is usually considered or comes to mind when considering a particular attitude object, i.e. behaviour. They are therefore those beliefs that are considered to be at the 'top of the mind'. Salient modal beliefs are salient with all members of a given population; they are susceptible to change and may be strengthened, weakened or replaced by other beliefs in their status as 'top of the mind' beliefs.

The question, how many beliefs are representative of 'a total set' of salient beliefs, is particularly important when consequently considering which beliefs to target with a persuasive message to change the attitude or norm and corresponding behavioural intent. The TORA has been criticised for not giving adequate guidance regarding this last issue (e.g. Elliott et al., 1995). However, Ajzen and Fishbein (1980) do point out the difficulty of identifying the point at which people start to mention beliefs that are non-salient. This is a particular problem in some forms of elicitation in which persistent, directed prompting can bring to the fore other statements that reflect new thinking triggered by the interview process. McKennell (1970, p.227) questions the economics of applying long lists, and recommends short belief lists for the main survey. The problem of maintaining the respondent's attention over long periods with the application of large numbers of belief statements, plus the tendency to influence their actual salient beliefs is obvious.

The need to use long lists of beliefs, e.g. twenty to thirty, in the application of the TORA, (e.g. Ajzen and Fishbein, 1980; Lynne and Rola, 1988; Prestholdt et al., 1987; Carr, 1988; Carr and Tait, 1991), has been questioned by Eiser and van der Pligt (1988) and more recently by Elliott et al. (1995), as such an approach appears to go against the theory of salience exceeding the information processing capacities of the subjects. When the subject is exposed to a long list of beliefs there is always a greater likelihood of finding reasonable correlations. These may not actually represent the most salient beliefs

that would be employed in future decision making regarding the behaviour in question. Elliott et al. (1995) contend that the evidence from practical applications of the TORA " … suggests that the sum of the five most salient beliefs about an attitude object is more highly correlated with the person's attitude toward that object than is the sum of the remaining non-salient beliefs" (Elliott et al., 1995, p.163).

Modal Salient Beliefs

It is not necessary to include measures of the 'personal' salient beliefs in the model, but to use those beliefs that are 'modally' salient for a given population, i.e. those most frequently identified by a representative sample of the targeted population Fishbein and Ajzen (1975). Modal salient beliefs are normally used, due to the cost and complexity of working with 'personal' salient beliefs only. Although modal salient beliefs have proved to be reliable Eiser and van der Pligt (1988) and Elliott et al. (1995) suggest that the three to five most salient 'personal' beliefs yield the strongest relationship to attitude.

The Identification of Salient Beliefs

Belief scales claimed to be representative of the expectations of the behaviour in question have been compiled in various ways as demonstrated by Sparks et al's (1991) brief review of their own different elicitation procedures as outlined below.

The compiling of a list of statements from the researcher's own suppositions regarding the possible outcomes or effects of the specific behaviour. The researcher's assumptions may not match the actual salient beliefs of the respondents. However if the object is to gain an understanding of their response to specific belief statements then this approach has its own logic, and this approach is applied more to normative beliefs where the researcher is interested in identifying the influence of particular social referents, whether salient or not.

The selection of beliefs found to be most frequently mentioned in literature pertinent to the behaviour in question, e.g. Zey and McIntosh's 1992 application of beliefs identified in separate studies; Eiser and van der Pligt's 1988 cited series of studies on attitudes to nuclear energy [1979, 1982 and 1986] where the belief statements were drawn from anti- and pro-nuclear literature. Eiser and van der Pligt's approach is interesting as it involved content analysis of a segment of pertinent literature. However, one must ask how representative are the views expressed in the literature of the subjects of the proposed study? Researchers have also tested general belief scales developed to represent the general public, e.g. Carr's (1988) application of a world view scale to one general behavioural domain, conservation.

The application of beliefs identified in a previous study of the behaviour on the same population e.g. Lynn and Rola (1988) and Bright et al's (1993) application of beliefs identified through research carried out earlier by the authors on the same population. The Manstead et al (1983) study also applied beliefs derived from other earlier research on the same population.

The 'structured' elicitation of positive and negative responses to the particular behaviour in a pilot survey of a sub-sample of the targeted population via structured questions. This is one of the most frequently used methods (e.g. Ajzen and Fishbein, 1980; Anderson and Kida, 1985; Elliott et al 1995; Towler and Shepherd as cited in Sparks et al. 1991). The influence of specific closed questions and prompting could lead to a power of suggestion on the statements made, therefore promoting a response to correspond with the perceived position of the interviewer rather than a response naturally at the top of the subject's mind.

The elicitation of beliefs through open interviews. This approach is also frequently used (e.g. Anderson and Shepherd (1989) as cited in Sparks et al. 1991; Carr, 1988; Doll and Orth, 1993; Jaccard and Davidson, 1975; Tourila, 1987). McKennell (1970, p.242) favours preliminary unstructured interviews and group discussions with individuals typical of the population to be surveyed, as a means of gathering representative opinion statements. Open interviews will, it is argued, tend to bring to the fore the most salient beliefs without the possible effect of directed specific questions and prompting. The open interview will also allow the identification of naturally associated activities within a particular behavioural domain and the most important or influential others with respect to the specific behaviours or activities.

Determinants of the Subjective Norm

A person's subjective norm with respect to a given behaviour is a function of his or her normative beliefs that particular 'salient' individuals or groups think he or she should or should not perform the behaviour in question. This is combined with the individual's motivation to comply with these persons or groups (Fishbein and Manfredo, 1992). Normative beliefs are therefore beliefs underlying a person's subjective norm.

Salient Referents

A salient referent is a person, or social entity, in the subject's social environment, who is influential in establishing normative components (Ajzen and Fishbein, 1980). It is assumed that if a person believes that important others, salient referents, would or would not approve of their performing the behaviour and there is a desire to comply with these referents, then a social pressure to perform or not perform the behaviour exists within the individual (Fishbein and Manfredo, 1992).

Identification of Salient Referents

The subject's salient referents, specific to the behaviour in question, are elicited in much the same way as salient behavioural beliefs, i.e. through open interviews or specific questions. To identify the modal normative beliefs a representative subsample should be questioned and those most frequently mentioned to be included in the set of modal normative 'salient' beliefs. Ajzen and Fishbein (1980, p.75) recommend the application of three questions related to the behaviour to help elicitation. First asking for the individuals or groups who would approve. Second, asking for those who would disapprove. Third, is there anyone else who comes to mind when considering the behaviour; four to seven referents are normally used in constructing a scale, although there appears to be no fixed limit.

Normative Beliefs

The theory states that the subjective norm is determined by the sum of the set of salient normative beliefs, each weighted by the corresponding motivation to comply, rather than the influence of any one referent. This implies that there is no necessary relationship between any single normative belief and the subjective norm. It is however only the salient referents that are likely to influence a person's subjective norms (Ajzen and Fishbein 1980, p.74). Attention is again drawn to the importance of congruence between the normative belief and the behaviour under consideration. The TORA depends on the step-wise discipline of maintaining the congruence between behaviour, intention, attitude and norms and their respective beliefs. The only point where this rule of correspondence appears to be broken is in the measurement of the motivation to comply.

Measurement of normative beliefs

The normative component is made up of the sum of the product of the belief strength and the motivation to comply as expressed in the specification equations (1) stated above. Each normative belief related to a particular salient referent is measured on a bipolar, semantic differential, such as the Likert scale. Ajzen and Fishbein (1980) recommend measuring the motivation to comply on a unipolar scale: "Since people are unlikely to be motivated to do the opposite of what their salient referent thinks they should do." It is suggested that this assumption could be questioned in situations were a particular salient referent is held in some contempt, although is still influential within the particular behavioural context.

Motivation to Comply

The inclusion of the 'motivation to comply' variable within the TORA model has been questioned. The authors recognise that this variable represents a weak point in their theoretical construct (Ibid, pp. 246-247). However, they state "...we are convinced that perceived social pressure must be taken into

account in order to explain social behaviour" (Ibid. p.246). Alternative forms of measuring this variable are suggested, e.g. measuring the influence of the behaviour of relevant others, 'the behavioural norm' (DeBarr 1993; Grube, Morgan and McGree, 1986) as an additional variable to the TORA. Various researchers have found that this reduces the predictive strength of the model (Eiser, 1984). While others have opted against including it because of this uncertainty (e.g. DeBarr, 1993). Although motivation to comply has been an area of debate with regard to the TORA, the complete model, including 'motivation to comply' has been tested widely (e.g. Doll and Orth, 1993) and has accumulated a record of predictive reliability as attested to in the various reviews of attitude-behaviour research (e.g. Ajzen and Fishbein, 1980; Olson and Zanna 1993; Sheppard et al., 1988).

Changing Behaviours

The TORA claims that in order to change behaviours one must first change the intent, thus implying change or reinforcement of the attitudinal and / or normative components. To change these components one must change the salient evaluative beliefs that support them (Fishbein and Manfredo, 1992). This implies the development of educational messages or other types of intervention that will address the most influential beliefs regarding the particular behaviour and the positive or negative intention to perform or adopt it. The development of effective educational messages will require attention to be given to four 'main points' identified by Fishbein and Manfredo (1992). These are, salience, selecting target beliefs, multiple determinants and the role of correspondence.

Salience

The theory states that it is the salient beliefs that are taken into account when making decisions. The educational messages must therefore address salient beliefs (Strader and Katz, 1990). Fishbein and Manfredo (1992, p.40) state that one of the main reasons for the failure of 'behavioural change campaigns' is their formulation without a prior awareness of the structure and interrelationship of salient beliefs and therefore when "...applying the Theory of Reasoned Action to a new behaviour or with a different population, it is imperative to conduct an elicitation survey to determine the salient outcomes and referents."

Selecting Target Beliefs

Not all salient beliefs, whether related to outcomes or social referents, necessarily account for the particular difference in behavioural intention. The first step is to identify whether the behavioural intent is primarily under attitudinal or normative influence and then to identify those beliefs that discriminate between the people who do or do not wish to perform the behaviour in question. The ability to identify what segments of the targeted population(s) believe or disbelieve and their

behavioural intent will help focus the development of educational interventions on those specific attitudinal or normative beliefs that are pertinent to the anticipated change. The target beliefs must be those that underpin the particular behavioural tendency that is in question.

Multiple Determinants

Both attitudes and subjective norms are based on sets of beliefs. It is therefore necessary when planning an educational programme to take into account the nature and relationship of the whole set of beliefs. As sets, the beliefs are assumed to have interdependence, and thus changing one belief may not be sufficient to bring about a modification of the attitude or subjective norm (Fishbein and Ajzen, 1992). Alternatively, change in a specific, targeted belief may change other beliefs that were supported by the particular belief undergoing change. In the absence of a prior understanding of the whole set's interdependence, the reciprocal change within the 'set' based on the modification of one primary belief may result in unexpected attitudes and subjective norms. "Changing one belief may impact upon another belief and, depending upon the direction of this effect, the impact may facilitate or inhibit change. For successful intervention one must change the evaluative and normative implication of the underlying cognitive structure. That is one must change the attitudinal [∑be] or normative [∑bm] cross products" (Fishbein and Manfredo, 1992, p.41).

The Rule of Correspondence

This is probably the most central rule of the TORA and constitutes one of the boundaries of the theory. Correspondence relates to the importance of ensuring the same level of specificity or generality between the behaviour and the model's variables -intention, attitude, subjective norm and the behavioural and normative beliefs. Attention to maintaining the same degree of specificity or generality between the defining elements -action, target, context and time- across the variables, helps ensure correspondence.

3 Applications of TORA to Decision-Making

Introduction

The TORA has been applied to a wide variety of behaviours (e.g. reviews of Ajzen and Fishbein, 1980; Randall and Wolff, 1995; Sheppard et al., 1988) particularly in the fields of health (e.g. Hoogstraten et al., 1985; Sewjwacz, Ajzen and Fishbein, 1980), politics and voting intentions (e.g. Eiser and van der Pligt, 1988; Fishbein, Ajzen and Hinkle, 1980; Granberg and Holmberg, 1990), religious behaviour (e.g. Gorsuch and Wakeman, 1991), corporate organisational management decisions (e.g. Elliott et al., 1995), sentencing recommendations (Katz, 1984), employment decisions (e.g. Prestholt et al., 1987; Strader and Katz, 1990), consumer and food choices (e.g. Fishbein and Ajzen, 1980; Sparks et al. 1991; Tourila, 1987; Zey and McIntosh 1992), smoking, drug and alcohol use (e.g. Bentler and Speckerd, 1979; Budd and Spencer, 1984; Grube et al., 1986; Jaccard and Davidson, 1975, Lopez, 1991), birth control and safe sex behaviour (e.g. Doll and Orth, 1993; Fishbein, Jaccard et al., 1980; Fishbein, 1990; Fishbein et al., 1992; Jemnott and Jemnott, 1991; Kashima, 1993). Debarr's (1993) review of the various applied settings of the theory is more complete than most.

Agricultural Applications

The applications of the TORA to agricultural decision-making are nowhere as numerous as for the above situations. Even so, the TORA has been applied to the area of agricultural and environmental conservation behaviour (e.g. Carr, 1988; Carr and Tait, 1991; Duff et al., 1991 Lynne, Shonkwiler and Rola ,1988; Lynne and Rola, 1988; Kiely-Borcato et al., 1980; Korsching and Hoban 1990;Tait, 1983; Napier et al., 1984).

Various studies of soil conservation have applied the TORA construct, e.g. Napier, Thraen, Gore and Goe (1984) and Duff et al. (1991). Lynne and Rola (1988) successfully applied the TORA to the study of farmers' soil conservation behaviour in the Florida Pan-Handle. They included a measurement of economic well-being and found that the more economically secure tended to have weaker attitudes toward conservation action. They found, however, that the two strongest predictors of conservation action were high income and strong conservation attitudes. They observed there was a trade off between the 'comfortable life' values on one side and 'world beauty' and 'being responsible' values on the other, which were associated with conservation action. The TORA has also been applied to other types of farm behaviour, e.g. the use of protective clothing (Perkins et al. 1992), and tractor safety behaviour (DeBarr 1993).

The earliest application of the TORA to a UK agricultural decision-making is perhaps the study by Tait (1983). An open version of the TORA has been used to interpret farmers' pesticide use decisions. Additional variables were included to distinguish differences in the farmers' backgrounds and

contexts. The study was carried out at a time when excess pesticide use and its possible effects were only just beginning to be questioned by food processors (although it was still acceptable to the farmers) and the general public was still basically unaware of the issue. The findings showed that the variables were more significantly related to intended use than to actual use. In general the beliefs about the effects of using pesticides and about the opinions of others regarding their use, were more significantly correlated with behaviour than were values and motivation.

Carr (1988) and the related paper (Tait and Carr, 1991) applied an open version similar to the approach adopted by Tait (1983) to study the differences between environmentalists and farmers regarding various conservation related practices. Where previous traditional opinion polls and attitude surveys had suggested a similar attitude toward the conservation of the countryside across the two groups, the application of the TORA to certain conservation-sensitive farming practices identified very strong differences between the two groups, demonstrating the possibility for conflict between the farmers and conservationists. Carr (1988) observed that the TORA did not allow a distinction to be made between deeply held values and self-interests and suggested that the method of constructing and scoring the behavioural index was inappropriate when value judgements were involved; the respondents experienced difficulty distinguishing between beliefs and values when evaluative opinions were used. However, more recent research applying the TORA to the adoption of organic farming practice was able to draw attention to the influence of values in the choice of farming practice, although the same economic considerations affected the organic and non organic farmers (e.g. Beharrell and Crockett, 1992).

The most recent application of TORA within the UK agricultural decision-making setting is in the form one of its extensions, the Theory of Planned Behaviour (TOPB), is to disentangle the conservation behaviour of Bedfordshire farmers in England (Beedell and Rehman, 1996; Beedell, 1996; Beedell and Rehman, 1999; Beedell and Rehman, 2000). An analysis of the hedge management behaviour of farmers using the TOPB construct revealed that those farmers who were "conservation minded" regarded the conservation benefits of hedge management to be morel true and value such benefits more highly than other farmers. The TORA and its extensions provide insights into behaviours that are otherwise are not forthcoming so readily.

The TORA has also been successfully applied by USDA Forest Service in research into the beliefs, attitudes and intentions of park visitors to vote on proposed burn policies, as an aid in structuring public education programmes (Manfredo, et al. 1990; Fishbein and Manfredo, 1992; Bright et al., 1993). It can also be used to establish baselines against which to measure changes in societal trends and public awareness.

Criticisms and Recommended Extensions to the TORA

The TORA has already established a large basis of empirical support from both laboratory and field applications. The theory continues to be tested and to prove its predictive capability (e.g. Doll and Orth's (1993) test of the theory applied to contraception choice amongst students). Criticism is not so much directed at the model itself but rather offers suggestions for enhancing its power within different contexts or with particular types of behaviour. Limiting the prediction of behaviour via intention to two variables, attitudes and norms, has been questioned by various researchers and forms the main criticism of the model (see review of Olson and Zanna, 1993). Although the TORA remains the most respected model for explaining the attitude-behaviour relationship (Norman and Smith, 1995; Olson and Zanna, 1993), alternative and expanded versions of the TORA have been put forward to improve the prediction strength of the model under certain conditions or behavioural domains.

As Eiser (1986) points out, the findings of various research applications lead to the conclusion that there is no single causal model that is likely to prove superior in all behavioural domains. "By the early 1980s the answer had become a little clearer: some attitudes guide behaviour in some circumstances" (Vincent and Fazio, 1992, p.53). However, it has been demonstrated that the TORA variables are common to most of the other models and that though under certain conditions an additional variable may be shown to improve the TORA's predictive strength, the underlying TORA construct has usually also proven capable of predicting the same behaviour. The examples include: Bentler and Spreckart's (1979; 1981) inclusion of 'prior behaviour'; Budd and Spencer's (1984) inclusion of 'ideal behavioural intention' regarding drinking; Grube et al. (1986) addition of the 'behavioural norm' to the study of smoking; Jaccard and Davidson (1975) comparison with the Triandis's (1977) Theory of Social Behaviour and the inclusion of moral obligation; Tuorila's (1987) addition of a 'liking' variable to the study of consumer behaviour; Lynne and Rola's (1988) inclusion of economic well-being; Granberg and Holmberg's (1990) inclusion of both 'self-identity' and 'prior behaviour' variables in the study of voting behaviour; Ajzen and Madden (1986) and Netmeyer et al. (1991) comparisons of TORA and TOPB, including a measurement of 'perceived behavioural control'.

Some of these alternative variables, e.g. prior behaviour, perceived behavioural control, attitude accessibility, behavioural norm, ideal behavioural intention, moral obligation, self-identity and personality traits affect the corresponding relationship of attitudes and norms to intention. They are also claimed, in certain instances, to reduce or remove the mediating role of intentions, leading to attitudes directly predicting behaviour. In some instances the added variable has been shown to be a direct predictor of the behaviour, e.g. past behaviour, as demonstrated by Norwich and Jaeger (1989). In the above review all these extensions to the TORA have not received any detailed attention as that would be beyond the scope of the current exercise.

The TORA's Simplicity and Applicability

The Theory of Reasoned Action is noted for its simplicity and for the limited number of variables that need to be manipulated for its application. It is a parsimonious model. According to the TORA the primary determinant of behaviour is not the subject's attitude to the behaviour but his or her intention to perform the behaviour. Behavioural intention is determined by two variables -the subject's attitude toward the behaviour and the subjective norm, i.e. the subject's perception of social pressure to perform or not perform the behaviour. These two principal determinants of intention are underpinned by corresponding sets of beliefs and values attributed to these beliefs.

The TORA is now recognised as one of the most reliable theories for predicting 'volitional' behaviour and explaining the attitude -behaviour relationship. Sheppard, Hartwick and Warshaw (1988, p.325) referring to their two meta-analyses of the TORA state: "Strong overall evidence for the predictive utility of the model was found. Although numerous instances were identified in which researchers overstepped the boundary conditions initially proposed for the model, the predictive utility remained strong across conditions." Simplicity and robustness are two characteristics that are considered important when proposing to take a model out of the laboratory setting into an applied, difficult field setting.

The TORA's proven ability to perform in a number of different contexts and with differing behaviours has led to its more general application, in contrast to other similar models, e.g. Triandis's (1977) Theory of Social Behaviour (TSB), including the influence of prior behaviour; Fazio's (1990) MODE model focusing on ***m***otivation and ***o***pportunity as ***d***eterminants of behaviour. Ajzen's (1988) Theory of Planned Behaviour (TOPB), an extension of the TORA including a separate consideration of perceived behavioural control, however, is gaining increased attention within the recent literature. The difference between these models is how they address the issue of volitional control, the additional variables taken into consideration and the types of behaviour to which they are applied. The TSB and MODE models deal with behavioural types that are low in volitional control because of their habitual or spontaneous nature relying on an apparent direct attitude-behaviour relationship. The TOPB (Ajzen, 1988) also addresses the issue of lack of volitional control but from the standpoint of perceived control, therefore dealing with behaviours that involve reasoning, but where other factors outside the subjects' control also influence their decisions. Though the extended version of the TORA, the TOPB, is receiving increased, recent attention in applied settings, (see following section on perceived behavioural control) the TORA remains one of the most utilised models particularly in the field of persuasion (Ajzen, 1992;Bright et al., 1993; Fishbein, 1990; Fishbein et al., 1992; Hoogstraten et al., 1985; Manfredo et al., 1990; Sheppard et al., 1988).

4 An Illustration of the Procedures Followed in Applying the TORA

Introduction

An outline of the procedures followed in the application of the TORA to the study under the present project is presented here. The following is illustrated with examples from a recent study conducted in Ghana into the barriers affecting the uptake of recommended varieties of rice and an ongoing study into the adoption of improved stoves.

The application of the Theory of Reasoned Action is generally a two-staged process. Stage one informs the subsequent development of the main questionnaire, the second stage.

The first Stage: the Identification of Outcome Beliefs

The first stage consists of a survey of a smaller sample of subjects who are representative of the objective group of the study. The purpose of the first stage is to identify the 'salient modal outcome beliefs' regarding the different behaviours to be studied; for the illustrative examples here, the adoption of a new rice variety and the reduction of pesticide use. The first stage survey also is used to also identify the most salient social referents regarding the behaviours of interest. A salient belief is one that is usually considered or comes to mind when considering a particular attitude object, i.e. behaviour. A salient modal belief is a belief, which is considered to be salient with most members of a given population. Similarly a salient social referent is a referent, a person or a social entity, considered to be influential to most of the subjects within the target population.

The identification of the salient outcome beliefs and social referents is needed to develop the attitude and normative scales required for the development of 'the second stage' structured interview schedule (questionnaire).

Different researchers have used a variety of methods in order to identify the salient beliefs and referents. For the Ghana study, the process recommended by Ajzen and Fishbein (1980) was followed; that is, a structured elicitation of both positive and negative responses to the behaviours in question. Likewise in the case of the present Project, focus group interviews regarding each of the main behavioural areas will be held with farmers representative of the target population.

The most salient outcome beliefs regarding each of the behaviours will be identified and selected on the basis of the number of different subjects who had emitted the same belief. Ajzen and Fishbein (1980, p.71) recommend that the salient modal belief scales should represent 75% or above of all beliefs emitted regarding the particular behaviour or behavioural category of interest. The salient social referents per behaviour will also be identified in a similar fashion. These salient beliefs and referents will form the attitude and normative scales in the structured interview questionnaire. It is recommended that too long a gap between the first stage survey and the second stage implementation of the structured interview should be avoided.

The Second Stage: the Structured Interviews

The description of the second stage process is based on the examples of recent studies undertaken in Ghana.

The structured interview schedule will be divided into distinct segments: the first deals with the descriptive variables, the other presents the TORA variable sets for each behaviour addressed; the development of the questionnaire following closely the format recommended by Ajzen and Fishbein (1980, pp.216-273).

Descriptive variables

A number of descriptive variables will be included in the questionnaire so as to identify different categories of farmers and the differences between these. These variables will be based on those commonly used in socio-economic research in the hills of Nepal to categorise farmers and farms.

The TORA Variables

The following describes the construct of the schedule (questionnaire), the specific areas of enquiry and the way in which each variable is elicited and measured. No attempt therefore is made here to define and discuss the concepts as they have been dealt with in the previous chapter.

The TORA section of the schedule will be divided into separate subsections relating to each of the behaviours (behavioural categories) addressed. The TORA variables will be applied to each of these behaviours separately. The sequence of presentation of these variables will be the same within each behavioural section. The order they are presented in below will follow the order within the schedule. Therefore, questions regarding the subject's current behaviour and behavioural intentions will be asked before questions regarding attitudes and beliefs.[1] All the variables apart from behaviour are measured on 5-point bi-polar scales[2]. Following Carr's (1988) reasoning it was decided to use a 5 as opposed to the usual 7-point scale. It was felt that a 7-point scale would only complicate the presentation and response process for the subjects and that the extra effort would provide little additional advantage. The following sections describe the Ghana rice questionnaire development.

Behaviour

The incidence of present or recent behaviour was measured by asking if the subject had performed the behaviour within a stipulated time period, e.g.

Have you practised the following activities during the past three years?

[1]Carr (1988: 108) contends that presenting the behavioural questions first helps avoid the respondents tailoring reported behaviour to be consistent with stated attitudes, beliefs and intentions.

[2] A bi-polar scale captures both negative and positive opinions or values, e.g. very weak to very strong. The mid-point is usually represented by a neutral statement, e.g. no opinion.

In most instances the behaviour was read as the index of a number of activities that were considered to represent the particular behavioural category of interest. The instance was measured on a yes (+1), no (-1) response scale, the sum of these responses providing the score as recommended by Ajzen and Fishbein (1980)[3].

Behavioural Intention

The behavioural intention was measured on two bi-polar 5 point, Likert type scales in response to a question relating to their intention to practice the particular behaviour within a stipulated area and time period, e.g.

How strongly do you intend to plant a new variety of rice seed in the next season?

The response was recorded along a scale ranging from very strong (+2), strong (+1), undecided (0), weak (-1) and very weak (-2).

The second scale tested their perception of the probability of their achieving this intention to behave. e.g.

How probable is it that you will plant a new variety of rice seed in the next season?

The response was recorded on a scale ranging from very probable (+2), probable (+1), don't know (0), improbable (-1) and very improbable (-2). This two-scale approach to measure intention has been adopted by various researchers applying the TORA construct; e.g. Doll and Orth (1993) used the same semantic differentials. The sum of the two scales was taken as representing the strength of intention. However, the single scale measure is most commonly used and is also applied within the following analysis.

Attitude

Two measures of attitude were used. A 'general' measure of attitude was measured by recording the response to whether the subject felt the behaviour was good or bad. e.g.

How good or bad is it to plant a new variety of seed in the next season?

The response was read on a bi-polar scale, with end points very good (+2) and very bad (-2).

Behavioural Outcome, Beliefs and Values (The Attitude Component)

The attitude is also read by calculating the sum of the products of both belief strength and value attributed to each salient outcome.

The most salient modal beliefs regarding each behavioural category were presented in two stages to capture both the strength of the beliefs and the values attributed to each. The order of presentation of these beliefs within each scale was random to avoid the suggestion of prior ranking. Each belief was

[3] Normally, a negative response regarding the practice of a particular sub-behaviour was given a value of -1. A response in the positive was given a +1 value. The scores for the 10 sub behaviours are then summed to give a behavioural index score with a possible range of -10 to +10.

assessed on two individual bi-polar 5-point scales. To test the belief strength, the respondents were presented with the following format -first, an introductory statement followed by the question and the list of beliefs and their corresponding scales. e.g.

The words I am about to read (to you) are what other rice farmers are saying about planting new varieties of seed.

In your opinion are the following statements true or not?

The new variety of rice will not grow too tall and fall over before it can be harvested

The new variety will give us more rice than the one we are now planting

Planting a new variety of rice will mean that we have pure (clean) seed in future

With the new variety of rice the crop will be more resistant to diseases ….

The belief strength was measured on a scale from, very true (+2), true (+1), don't know (0), false (-1) very false (-2).

The subjects were then asked to value each belief statement, e.g.

Could you also indicate how good or bad the outcome of each statement would be?

The responses were measured on a similar scale with end points being very good (+2), to very bad (-2). Ajzen and Fishbein (1980) recommend that the outcome belief and value score be multiplied and the products for all the beliefs summed to provide a reading that is then correlated with the separate 'general' reading of attitude. When applying the disaggregated TORA analysis Tait (1983), Carr (1988) and Beharrell and Crockett (1992), took the product sum reading of the beliefs to represent 'overall' attitude, i.e. $A = \Sigma\ b_i e_i$

(Where A = Overall attitude, b = Belief, e = Evaluation, n = Number of opinion statements in the scale)

This reading is correlated with both behavioural intention (BI) and actual behaviour (B). Each belief (b_i) value (e_i) and each belief product sum ($b_i e_i$) is also correlated with BI and B. This approach provides the means for describing the decision process in greater depth and identifying the influence of each belief or cluster of beliefs (Carr and Tait, 1991; Beharrell and Crockett, 1992). The disaggregated approach permits the use of the TORA construct as a tool for identifying the different belief structures within the population, which may be acting as barriers to the uptake of research recommendations.

The subjects were also asked to identify, besides the possibility of a higher yield, what was the main reason that would encourage them to plant a new pure variety of seed in the following year. This provided a form of cross-checking the responses on the scales. It also provided an alternative

indication of the most salient of these beliefs within the wider population and a means of comparing the findings of the fist stage group interviews regarding belief salience.

The Subjective Norm

As with attitude measurement, two forms of reading the subjective norm were applied: a general measure and a 'product sum' measure of the normative component. The TORA normally requires the comparison of this product sum calculation with a separate 'general' measurement (Ajzen and Fishbein, 1980) of the subjective norm in response to the question:

. *How likely is it that the people **who you respect most** would think you should plant a new variety of seed next year?*

The response is measured on a 5-point bi-polar scale with end points very likely (+2), to very unlikely (-2).

The normative component

Normative Beliefs

Lists of the most salient social referents regarding each behavioural category were presented. The subjects were asked to state how good or bad each of these referents would think the subject's carrying out of the particular behaviour, e.g.

Indicate how strongly the following would agree or disagree with you planting a new rice variety seed in the next rice crop?

The responses were registered on scales with end points, very strongly (+2) to very weak (-2).

Motivation to Comply

The subject's motivation to comply with each salient referent was measured on a 5-point bipolar scale in response to a question, e.g.

How motivated would you be to follow the advice of the following regarding the planting of new rice variety next year?

The responses were registered on scales with end points, very strongly (+2) and very weak (-2). However, in most applications of the TORA the motivation to comply is normally measured on a uni-polar scale (Ajzen and Fishbein, 1980). This is because it is assumed that most people would not register a negative motivation toward a particular referent. However, experience over various studies has demonstrated the opposite is often true.

The Subjective Norm (product sum calculation)

The form of calculating the subjective norm is to take the product of the normative beliefs and motivations and sum the products across the different referents, (e.g. Ajzen and Fishbein, 1980, p.74; Tait 1983; Carr 1988), i.e. $SN = \Sigma\, b_j m_j$

Where **SN** is the subjective norm, **n** the number of referents, $\mathbf{b_j}$ the normative belief, $\mathbf{m_j}$ motivation to comply.

As in the case of outcome beliefs, the disaggregated approach permits the correlation of the product-sum calculation of the SN directly with both BI and B. The separate normative beliefs ($\mathbf{b_j}$) and motivations ($\mathbf{m_j}$) and product sums ($\mathbf{b_j m_j}$) can also be correlated with BI and B, increasing the descriptive utility of the TORA construct.

Analysis

As indicated above, the TORA model has been applied in a variety of ways, e.g. the aggregated model and the disagregated form. The full aggregated model is normally used to predict behaviour and requires multiple regression analysis to determine the relative contributions of attitudes and norms to the formation of behavioural intentions (Ajzen and Fishbein, 1980). This assumes that the data meets the conditions for parametric analysis. As stated previously and in common with Carr's (1988, p.122) observation, it is not assumed that the scales used are true interval scales nor that the individual scores represent part of a normal distribution. Both of these are basic required assumptions, if the parametric tests are to be applied (Greene and D'Oliveira, 1982, p.80). The scores will be treated as ordinal data and require the appropriate non-parametric statistical forms of analysis; therefore, requiring an alternative application of the TORA construct.

As Carr (1988) notes, many researchers have chosen to apply the model in a disaggregated form to study the patterns of individual beliefs and their influence on both behavioural intention and behaviour (e.g. Tait, 1983; Carr, 1988; Carr and Tait, 1991) and more recently (Beharrell and Crockett, 1992; McKemey, 1996; Beedell and Rehman, 1999).

The nature of these beliefs and degree of correspondence between Behaviour (B) and Behavioural Intent BI will provide indications regarding the distinctions between the different subjects' / subject categories' behaviours and behavioural intentions. It is therefore assumed this process of analysis will indicate those factors that are inhibiting or encouraging the uptake of the particular behaviours in question. The disaggregated form of the model and the corresponding non-parametric tests therefore will be adopted in the analysis of the research data.

Relationships between the different main variables within the TORA model.

Spearman Rank Order[4] correlation tests will be applied to identify the strength of relationships between the different principal variables, e.g. between the different outcome statement attitudes ($b_i e_i$) with intention (BI)[5]. This approach has been applied by various researchers to identify the most influential cognitive 'barriers' and / or 'drivers' acting on the subjects' decision to adopt the particular

[4] Alos known as 'rho' and is used show a relationship between two variables that have been arranged according to rank order and have also been measured on an ordinal scale.

[5] These outcome statement attitude products ($b_i e_i$) can and will be correlated with behaviour (B).

behaviour in question (e.g. Ajzen and Fishbein, 1980; Tait, 1983; Carr, 1988; Zey and McIntosh 1992; McKemey, 1996). Some researchers however, have chosen to correlate the outcome attitudes (b_ie_i) with the overall measure of attitude ($\Sigma\ b_ie_i$) in order to identify the most influential outcome beliefs, e.g. Beedell and Rehman (1999). In the case of the proposed research the first of these options will be applied.

The overall measure of attitude ($\Sigma\ b_ie_i$) is also correlated with both the intention (BI) and behaviour (B). If an alternative measure of general attitude has also been acquired, the two measures of attitude can be compared to test the validity of the product sum measure (It is generally assumed that the product sum measure is more accurate if based on reliable salient belief scales. The Alpha Coefficient test of scale reliability will be applied to each scale involving more than one element. The Alpha coefficient is the mean of all possible split-half coefficients. It avoids the need to test - retest to establish reliability (Cronbach 1951).

The individual referent normative products (m_jb_j) are also correlated with both IB and B to identify which of the referents are most influential. The product sum measure of the subjective norm ($SN = \Sigma\ b_jm_j$) is also correlated with both IB and B. As with the measurement of attitude, an alternative measure of the SN is often taken, i.e. in response to a question regarding the subject's 'most important' referent, which may or may not be included in the list of identified salient referents. This alternative reading of the subjective norm as opposed to the product sum approach is considered to be the most representative (sensitive) and is therefore also usually correlated with both IB and B. This is the case in the following example.

The strength of the (A vs. BI and B) correlations are then compared with the subjective norm (SN) correlations with IB and B to identify whether the attitude or normative component has the greater influence on the subject's intention and / or current behaviour.

It is claimed that a correlation between the stated intention IB and current or recent behaviour (B) may help to identify states of dissonance and, therefore, the susceptibility to change (e.g. McKemey, 1996).

The Mann Whitney U Test[6] will be applied to identify the differences between the distinct categories of subject, detected via the descriptive variables, e.g. type and size of farm.

The following example presented in Figures 2a and 2b is taken from an ongoing study in Ghana of improved stove adoption. Figure 2b demonstrates if a significant difference is present between the mean measures of the corresponding variables of the two the populations being compared (e.g. *p <0.05; ** p <0.01: ***p<0.001) and the relationships between these variables. The boxes on the lines linking the variables present the correlation coefficients and the p values if significant (i.e. <0.05). In

[6] It is a statistical test which is used to establish the significance of the differences between two groups for which the data have been measured on ordinal scales. It is a non-parametric test and is equivalent to the *t* test. Despite using the ordinal measures, the underlying distribution is assumed to be normal.

Figures 2a and 2b the alternative reading of the subjective norm rather than the product-sum measure is presented. The example presents the differences that have been observed between those that have been exposed to deliberate extension interventions to promote improved stoves (with extension) and those who have not been exposed (without extension). Tables 1 to 5 present the data from which Figures 2a and 2b are derived.

Table 1: TORA Comparative With / Without Extension Mann-Whitney U Tables

Improved Stove Use TORA Variables Number of respondents	Without Ext[1] 118 Mean	With Ext[2] 112 Mean	**Mann-Whitney U Significance.**
Improved stove **behaviour** index Range (-10 to +10)	-3.19	0.79	**0.000**
Improved stove **intention** Range (-2 to +2)	0.62	1.550	**0.000**
Attitude to using improved stoves (Statement) Range (-2 to +2)	1.18	1.620	**0.000**
Improved stove use (sum) of attitude $\Sigma b_i * e_I$ Range (-60 to +60)	9.47	18.725	**0.000**
Improved stove use subjective norm (Statement) Range (-2 to +2)	1.02	1.410	**0.000**
Improve stove subjective norm (sum) $\Sigma m_j * b_j$ Range (-24 to +24)	9.35	11.036	**0.023**

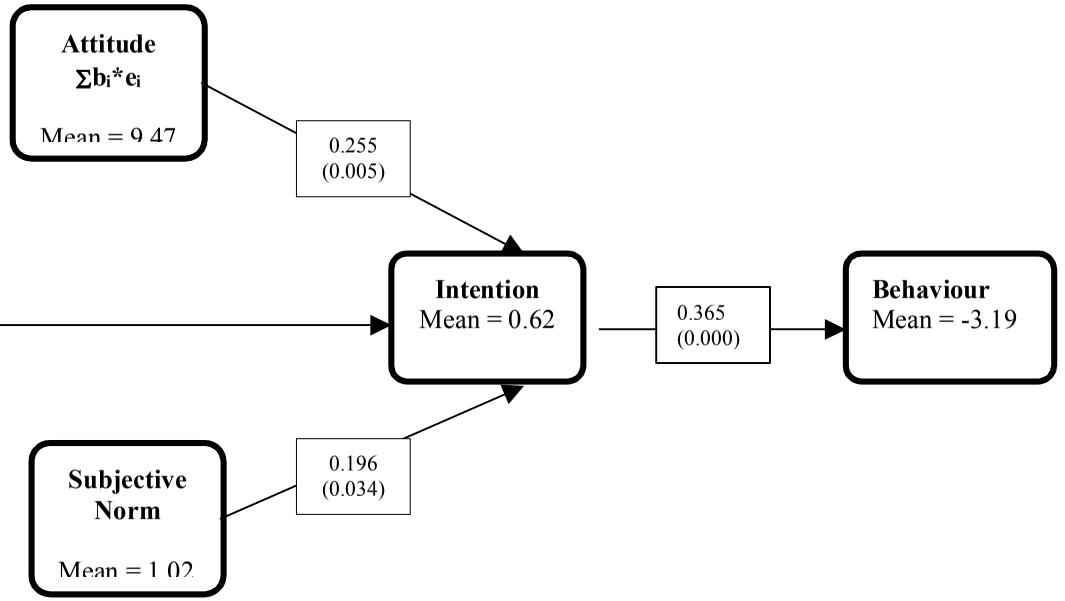
[1]With extension [2]Without extension

Table 2: Improved Stoves: Comparison (with/without extension) TORA Correlation Tables

Improved Stoves TORA Variable Correlations		Without Extension Intention	With Extension Intention
Improved stove use **behaviour** index	Correlation Coefficient Sig. (2-tailed)	0.369 0.000	
Improved stove use (sum) of attitude $\Sigma b_i * e_i$	Correlation Coefficient Sig. (2-tailed)	0.255 0.005	0.222 0.018
Improved stove use subjective norm (Statement)	Correlation Coefficient Sig. (2-tailed)	0.196 0.034	0.450 0.000
Improved stove use subjective norm (sum) $\Sigma m_i * b_I$	Correlation Coefficient Sig. (2-tailed)		0.379 0.000

Figure 2a: Improved Stove Adoption 'Without' Extension Intervention: n = 118

Ranked Influential Attitudes (b*e) Correlation With **Intention**		Corr Co Sig.
They use less fuel	**(Driver)**	0.403 (***)
Able to cook preferred foods	**(Driver)**	0.391 (***)
Will reduce cost of cooking	**(Driver)**	0.359 (***)
Improved stoves will be able to cook our pots	**(Driver)**	0.356 (***)
They are easier to light	**(Driver)**	0.352 (***)
Coal pots can be used in the house	**(Driver)**	-0.300 (***)
You can move an improved stove	**(Driver)**	0.266 (**)
All will have to get non-wood stoves	**(Driver)**	0.244 (**)
Improved coal pots are better	**(Driver)**	-0.219 (*)



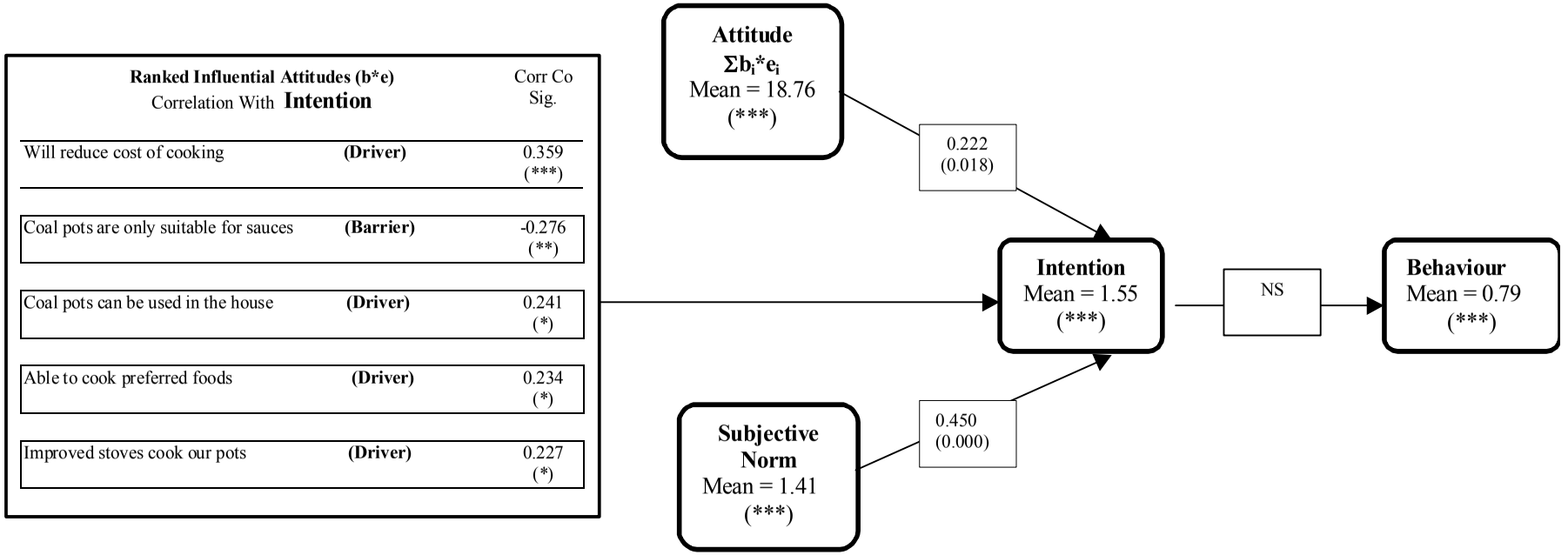


Figure 2b: Improved Stove Adoption 'With' Extension Intervention: n = 112

Table 3: Improve Stove Attitude Correlation Comparisons (With/without)

Stoves Attitudes (b*e)		Without Extension	With Extension
		Intention	Intention
Improved stoves will cook our pots (Attitude 1)	Correlation Coefficient	0.356	0.227
	Sig. (2-tailed)	0.000	0.016
improved stoves are available (Attitude 2)	Correlation Coefficient		
	Sig. (2-tailed)		
Cannot cook more than one pot at a time (Attitude 3)	Correlation Coefficient		
	Sig. (2-tailed)		
You can move an improved stove (Attitude 4)	Correlation Coefficient	0.266	
	Sig. (2-tailed)	0.004	
All will have to get a non-wood stove (Attitude 28)	Correlation Coefficient	0.244	
	Sig. (2-tailed)	0.008	
They are not durable (Attitude 6)	Correlation Coefficient		
	Sig. (2-tailed)		
They use less fuel (Attitude 7)	Correlation Coefficient	0.403	
	Sig. (2-tailed)	0.000	
They are easier to light (Attitude 9)	Correlation Coefficient	0.352	
	Sig. (2-tailed)	0.000	
Able to cook preferred foods (Attitude 10)	Correlation Coefficient	0.391	0.234
	Sig. (2-tailed)	0.000	0.013
Will reduce cost of cooking (Attitude 11)	Correlation Coefficient	0.359	0.359
	Sig. (2-tailed)	0.000	0.000
Coal pots are only suitable for sauces (Attitude 13)	Correlation Coefficient		-0.276
	Sig. (2-tailed)		0.003
Improved coal pots are better (Attitude 15)	Correlation Coefficient	-0.219	
	Sig. (2-tailed)	0.017	
Coal pots can be used in the house (Attitude 17)	Correlation Coefficient	-0.300	0.241
	Sig. (2-tailed)	0.001	0.010
Will not permit use of wood inside (Attitude 20)	Correlation Coefficient		
	Sig. (2-tailed)		
Three stoves are best (Attitude 25)	Correlation Coefficient		
	Sig. (2-tailed)		
Improved stove Attitude (SUM) $\Sigma b_i * e_I$	Correlation Coefficient	0.255	0.222
	Sig. (2-tailed)	0.005	0.018

Table 4: Stoves: comparison of differences between Attitude variable mean scores

Improved Stove Attitudes (b*e)	**Without Ext N = 118 mean**	**With Ext N = 112 mean**	**MW Sig.**
Improved stoves will cook our pots (Attitude 1)	0.86	1.76	**0.000**
Improved stoves are available (Attitude 2)	0.46	0.61	
Cannot cook more than one pot (Attitude 3)	0.12	0.04	
You can move an improved stove (Attitude 4)	0.69	1.79	**0.000**
All will have to get a non-wood stove (Att 28)	1.30	2.01	**0.002**
They are not durable (Attitude 6)	0.01	0.61	**0.001**
They use less fuel (Attitude 7)	1.03	2.71	**0.000**
They are easier to light (Attitude 9)	0.92	2.33	**0.000**
Able to cook preferred foods (Attitude 10)	1.03	2.07	**0.000**
Will reduce cost of cooking (Attitude 11)	1.03	2.38	**0.000**
Coal pots are only suitable for sauces (Att 13)	-1.41	-1.17	
Improved coal pots are better (Attitude15)	1.21	1.03	
Coal pots can be used in the house (Att 17)	2.28	2.02	
Will not permit use of wood inside (Att 20)	1.46	1.63	
Three stones are best (Attitude 25)	-1.52	-1.10	**0.041**
Stove Attitude (SUM) $\Sigma b_i * e_I$ Range (-60 to +60)	9.47	18.73	**0.000**

Table 5: Comparison of differences between Normative variable mean scores regarding improved stove (Mann-Whitney U Test)

Improved Stove Subjective Norms	Involvement in Extension Programme		
	Without Extension N = 118 Mean	With Extension N = 112 Mean	**MW Sig.**
Spouse SN 1	2.33	2.76	**0.043**
Extension Agent SNS 2	1.68	2.27	**0.001**
Community SN 3	1.28	1.48	
Family SN 4	1.60	1.84	
Landlord SN 5	1.14	1.30	
Radio SN 6	1.31	1.38	
Improved Stove Use SN (sum) $\Sigma m_j * b_j$ Range (-24 to +24)	9.35	11.04	**0.023**

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