

# **Social Research Working Paper**

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## **Compliance Behaviour and Community Outrage**

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## 1. Introduction

Inspiring a community to comply with regulatory policy or adopt favourable behaviours requires more than mere presentation of information, as behaviour change is dependent on more than simple breadth of knowledge about a subject. Shaping behaviour through education requires an understanding of the formation of attitudes from the interpretation of information, and the engagement of behaviour resulting from attitudes and other influences such as subjective norms.

The link between information processing and attitude formation is the focus of communication models, such as the Elaboration Likelihood Model (Petty & Cacioppo, 1981, 1986). These models explain how a persuasive message is processed, which aspects of the communication process are likely to have most influence in a given set of circumstances, and how this leads to attitude change.

The process from attitude formation to behaviour is the realm of behavioural models. Social, psychological and environmental influences interact in various ratios to produce behaviour, indicating that information alone is insufficient to initiate and maintain behaviour change. Understanding the factors influencing attitudes, intentions, and actions are essential to predicting behaviour based on attitude persuasion.

The development of effective educational tools and intervention programs not only requires an understanding of the influence of perceptions on behaviour, but also the effect of attitudes. Thus, they require input from not only models of communication processes, but also models of behaviour.

Traditional economic approaches to compliance behaviour have been based on cost-benefit theory, where an individual is considered a rational utility maximiser. The individual was considered an economic agent who 'weighs up' the economic gain obtained from non-compliance against the likelihood of detection and the severity of the penalty. Compliance was thought to be motivated via rational avoidance of possible penalty, so the threat of punishment was the essential policy tool with which to achieve compliance (Sutinen & Kuperan, 1999).

This approach, however, does not explain cases in which compliance is achieved voluntarily (Taylor, 2001), and viewing self-interest as the primary intrinsic motivator of behaviour is too simple an explanation of human motivation. Whilst deterrence is an important aspect of regulation enforcement, it is not sufficient to explain the complexities of compliance behaviour (Trivedi, Shehata, & Lynn, 2003), particularly when the behaviour is adopted without coercion.

Modern approaches understand compliance to be fostered through calculated, normative, and social motivations, as well as an awareness of, and capacity to comply with rules (Trivedi, Shehata, & Lynn, 2003). Studies of compliance regulation indicate moral reasoning, value orientation and risk preferences to be influential factors (e.g. Trivedi, Shehata, & Lynn, 2003) in whether people choose to adhere to policy or not.

Kohlberg (1969) developed a theory of moral development that was based on pre-conventional, conventional and post-conventional levels of reasoning, with a total of six stages. Pre-conventional moral decisions are made based on fear of punishment (stage 1) or self-interest (2). At the conventional level, moral reasoning is based on helping or pleasing people (3), or fulfilling norms (4). Finally, post-conventional reasoning involves making choices on concepts of rights/social standards (5), or from universal ethical principles determined by an individual's conscience (6).

Moral reasoning may affect compliance behaviour in so far as avoiding or adhering to policy is a moral decision, where personal benefits and costs are weighed against societal benefits and costs. In this sense, a lower level of moral reasoning would be reflected in an emphasis on personal costs and benefits, rather than on society.

Value orientation refers to the different goals that people pursue when making decisions that affect others. People may be altruistic-aggressive, cooperative-competitive or individualistic. Altruists (who want the best for others) are the opposite of aggressors (who want the worst for others), but are the same in making decision without regard for the impact on themselves. Cooperators seek the best outcome for all, whereas competitors desire a better position than others. Individualistic people seek the best for themselves regardless of others. Because compliance involves the notion of a contribution to the greater good of society, value orientation may influence the way people consider the utility of compliance.

In light of Prospect Theory (e.g. Tversky and Kahneman, 1981) risk preference is suggested to impact behavioural choices through the perception of the policy demanding compliance. The theory suggests risk-averse motivations are prominent in positive or gain situations, and risk-seeking attitudes in loss domains. Thus, if policy is viewed as socially favourable rather than personally costly, then the reference point is social gains, and risk-averse behaviour is likely to be adopted. In contrast, viewing compliance as a costly personal endeavour, the reference point is the loss domain, and risk-taking behaviour is likely to be adopted (Trivedi, Shehata, & Lynn, 2003).

To understand how factors such as moral reasoning, value orientation and risk preference impact on behaviour requires an examination of the forces underlying human behaviour. Behaviour theories offer the greatest insight into the various processes involved in the formation of attitudes and intentions, and what makes people act on them.

## **2. Behavioural Models**

In deciding how to behave, people may engage in a variety of processes including deliberation, social comparison, imitation, and habit formation. Behaviour theories describe these processes through explanation of issues such as attitude formation and change, human needs and motivation, the principles of reasoned action, social learning and social comparison processes, social facilitation and inhibition, and classical and operant conditioning. Because both individual and environmental factors influence a person's cognitive processing strategy, behaviour models provide theoretical insights that have varying relevance depending on context. For example, when a person's habitual behaviour is undergoing change, attitude formation, reasoned decision making and observation of others' behaviour are important influences.

Contemporary behavioural models typically fall into one of two categories, continuum (also known as static) or stage (dynamic) theories. They are distinguished in terms of whether they attempt to predict behaviour using single or multiple prediction equations. Those that form an equation predicting behaviour outcomes based on the combination of variables (such as perceptions of risk) that influence action, are called continuum theories. The notion is that variables combine to influence action in the same way for everyone, with each person located on a continuum where the value generated by the equation indicates the probability that the person will act (Weinstein, Rothman, Sutton, 1998). Increasing the value of this 'prediction equation' through intervention is suggested to increase the likelihood of behaviour change.

Stage theories, on the other hand, view the adoption of behaviours as occurring at the conclusion of a series of stages, with different prediction rules required to understand the factors involved at the different stages (Weinstein, 1993). These theories suggest that the steps preceding actions or reactions to hazards are too distinct and complex to be predicted accurately with one decision rule. One essential assumption is that the stages are qualitatively distinct, reflecting the different patterns of behaviour exhibited across the stages. Another suggestion is that the variables influencing one stage may not have an impact in a different stage. For example, deciding to change behaviour and actually acting may be influenced by different factors.

## ***Stage theories of behaviour possess four defining properties***

### **1. A Classification System to Define the Stages**

Each stage consists of a set of definitions that determine whether a person should be assigned to that stage. To be assigned to a particular stage is to be labelled with the attributes that define that stage. Whilst individual differences will of-course exist among members of a particular stage, the important feature is that these differences will be relatively smaller than the differences between people in different stages.

### **2. An Ordering of the Stages**

The nature of stage theories indicates that progression of behaviour requires traversing earlier stages in a sequential order. The end result is never inevitable or irreversible, and progressing through the stages can be done in moments or might never occur depending on the factors operating on an individual (Weinstein, Rothman, & Sutton, 1998). Behaviour is not viewed as a steady incremental process, as different issues are important at different times, and at any point the process can be halted, reversed, or even abandoned.

### **3. Common Barriers to Change Facing People in the Same Stage**

The third feature of a stage theory of health behaviour is the requirement that people at a given stage face similar barriers and, consequently, that they can be helped by similar interventions (Weinstein, et al., 1998).

### **4. Different Barriers to Change Facing People in Different Stages**

Particular stages should possess barriers of different nature and difficulty. Acknowledgment of personal risk, for instance, might be required before people will decide to act, whereas training might be needed before people will carry out that decision. Other factors, however, might facilitate progress regardless of stage. For example, knowing people who have adopted a precaution may encourage movement toward action, irrespective of a person's stage (Weinstein, et al., 1998).

A key advantage of stage theories is that they offer a framework that is useful in determining the changing influences on people's cognitions as they adopt behaviours. They therefore provide insight into how behavioural or educational programs can be effectively developed to efficiently manage people's progress towards behaviour change.

## 2.1 Social Cognitive Theory (SCT)

Social Cognitive Theory (Bandura, 1977, 1986, 1997, 2001) has been used in a wide variety of interventions and evaluation approaches. The theory proposes a triadic, dynamic, and reciprocal model in which behaviour, personal factors, and environmental influences all interact to produce an individual's behaviour. Not all sources of influence are of equal strength, and the individual's beliefs about ability (self-efficacy), expectations of behavioural outcomes (outcome expectations), and evaluation and modification of behaviour toward specific goals (self-regulation), all influence the interaction between environment and individual (Bandura, 1986).

The interaction between a person and their behaviour involves the person's expectations, beliefs, self-perceptions, goals, and intentions giving shape and direction to behaviour, whilst their actions in-turn affect their thoughts and emotions. The interaction between personal characteristics (such as age, race, and gender) and environment (social influences, physical structures) shapes human expectations and cognitive competencies. These social influences can convey information and activate emotional reactions through such factors as modelling, instruction, and social persuasion (Bandura, 1986). It is also posited that personal characteristics such as age, sex, ethnicity, temperament and so on lead to different responses to the social environment. Finally, the behaviour-environment interaction suggests that people are both products and producers of their environment (Bandura, 1977,1986). Behaviour determines which aspects of the environment a person is exposed to, and the environment in-turn determines which forms of one's behaviour are developed and activated. The nature of how someone focuses their attention affects the manner in which they experience the environment, such as whom they interact with and what activities they participate in.

The cognitive factors that influence the dynamic interactions of the person-behaviour-environment triad include self-efficacy, outcome expectations, and self-regulation. Bandura (1997, p.3) highlights self-efficacy as the driving force of human behavior, defining it as "belief in one's capabilities to organize and execute the course of action required to produce given attainments". In other words, it is what you believe about your capability to perform a certain action. It reflects the notion of personal agency, and is a strong determinant of effort and persistence (Bandura, 1977, p. 194): "Efficacy expectations are a major determinant of people's choice of activities, how much effort they will expend, and of how long they will sustain effort in dealing with stressful situations". As Schwarzer and Renner (2000) indicate, an individual's belief in carrying out desired behaviour enables them to engage in an active and self-determined life course. Self-efficacy is determined by performance accomplishments, verbal persuasion, vicarious experience, and physiological states (Bandura, 1977).

An outcome expectation is an individual's perception (physical, social and self-evaluative considerations) of the possible consequences of a particular behaviour. A negative outcome expectation, for example, arises when an individual perceives limitations preventing them from behaving in a manner consistent with their ideal or desired action.

Like outcome expectations, self-regulation is self-defining. Graves (2003) defines it as "the process of planning, monitoring, and changing one's behaviours and cognitions to correspond with abilities, the environment, and desired outcomes". He further points out its relation to the other factors:

- Self-regulation bridges efficacy beliefs and expected outcomes such that desired goals are attained by a cycle of practice and adaptation until the specific goal has been met; higher goals are then set, indicative of an upward spiraling process.

Outcome expectations and self-efficacy differ in the sense that whilst the end result of a particular course of action may easily be perceived, the ability to execute the actions necessary to obtain such an end may be questioned (Fouad & Smith, 1996). To adopt desired behaviour people form intentions prior to attempting to carry out actions. Both are key determinants of intention formation, but outcome expectations have little influence on action control, whereas self-efficacy is essential to both intention and action. For example, positive outcome expectancies appear to persuade decision making towards behaviour change. The actual performance and maintenance of the behaviour is a new problem, however, and it is here perceived self-efficacy continues to operate as a controlling influence.

One difficulty particular to SCT is that its comprehensiveness and complexity make it difficult to operationalise. Whilst studies that use SCT in particular arenas such as health address specific issues, SCT requires broader definitions to maintain its cross-disciplinary integrity. For example, problems in generating hypotheses exist because the constructs are unspecific, and this difficulty in testing them makes the theory hard to disprove. The multiple concepts are also difficult to implement together in an intervention.

As a broad theoretical framework, social cognitive theory itself has not been applied as extensively as some behavioural models, though many of these identify themselves as social cognitive approaches. Further, the components of the theory have contributed to the development of many behavioural models, indicating its centrality in behaviour theory.

Social cognitive theory has been applied to nutrition behaviour (Anderson, Winett, & Wojcik, 2000; Schwarzer & Renner, 2000), cancer preventative behaviour (Miller, Shoda, & Hurley, 1996; Seydel, Taal & Wiegman, 1990), cancer patients' quality of life (Graves, 2003), and exercise behaviour (Dzewaltowski, 1989). It has also been employed in educational & career choices (Bishop & Bieschke, 1998; Nauta & Epperson, 2003; Lent, Brown & Hackett, 1994), and complex decision-making (Wood & Bandura, 1989).

An example of a stage model based on social cognitive theory that is applied in the field of health is the Health Action Process Approach (HAPA). The model is a good example of how social cognitive concepts are applied to explain the process of behaviour change.

## **2.2 Health Action Process Approach (HAPA)**

The Health Action Process Approach (Schwarzer, 1992) is a social-cognitive theory, observing behaviour change to be influenced by a combination of expectancies, incentives and social cognitions. The theory identifies a distinction between a motivation phase and a volition phase. This distinction reflects a critical decision point between the formation of intentions and the translation of them into action. The motivational process of developing intentions is viewed as very different to the subsequent planning, action and maintenance occurring in the volition phase (see Figure 1).

Perceived self-efficacy is understood to be involved through all stages, because a lack of belief or conviction in capability will result in a failure to adopt, initiate, and maintain behaviour. Risk perceptions, on the other hand, initiate contemplation but do not extend beyond the motivation phase. Similarly, outcome expectancies are chiefly important in the motivation phase when individuals balance the pros and cons of certain consequences of behaviours, but they lose their predictive power after a personal decision has been made.

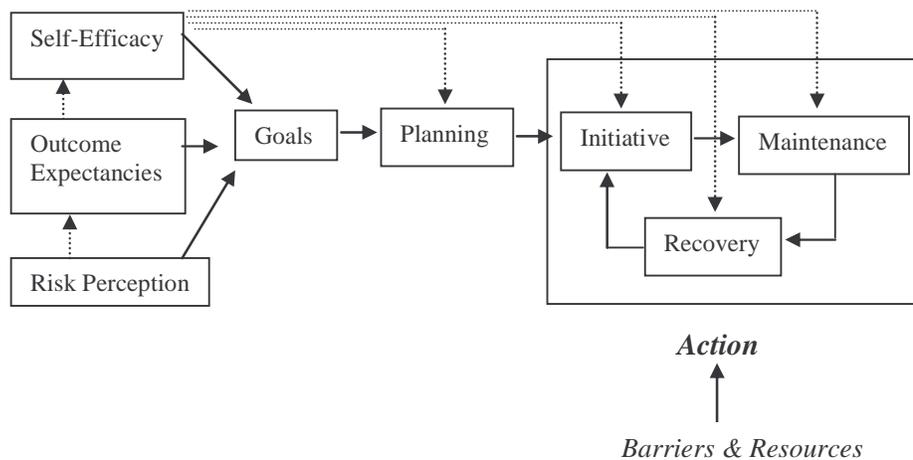
### **2.2.1 Motivation Phase**

The motivation phase involves the formation of intentions (goals) to address present risk behaviour through adopting a precautionary measure or engage in other behaviour. The primary predictors of intention formation are outcome expectancies and self-efficacy. It is assumed that consideration of behaviour consequences generally precede consideration of behaviour ability, so outcome expectations are modelled as precursors to self-efficacy.

The direct influence of outcome expectancies on intentions may be reduced by the mediating effect of self-efficacy, though both are still believed essential to the prediction of intention. In contexts where behaviour under contemplation has never been experienced, outcome expectancies may well be the more powerful influence.

Based on an understanding that fear appeals are of limited value in inciting risk perceptions (threat), the theory implies that health messages need to be framed to initiate people's coping resources and skill utilisation to control health threats. To get people to adopt effective health precaution strategies, persuasive communications should focus on the self-percepts of personal coping abilities.

**Figure 1:** Health Action Process Approach



The inference is that threat becomes a distal antecedent that assists in stimulating outcome expectancies that in turn stimulate self-efficacy, rather than a primary instigator of behaviour change at all stages. Whilst a minimum level of threat or concern must exist before people start contemplating the benefits of possible actions (and ruminate their competence to actually perform them), the direct path from threat to intention may become negligible if expectancies are already well established. Whilst a general process of intention or goal formation appears here, the particular context and personal experience may alter the pattern of influence, reflecting the social-cognitive nature of the theory.

### 2.2.2 The Action Phase

While the motivation phase is described what people choose to do, the subsequent volition phase describes how hard they try and how long they persist. It consists of cognitive (plans for action and control), behavioural (will to change) and situational (perceived social support and absence of situational barriers) levels.

When a favoured behaviour is identified, detailed cognitive instructions for performing the desired action need to be shaped. Losing weight, for example, requires things like planning what foods to buy, eating and exercise patterns, and possibly quitting smoking. The original goal then becomes a global intention consisting of a range of subordinate intentions with their own sets of goals and action plans. The cognitive construction of specific action plans is assisted by self-efficacy through visualising scenarios that can guide goal attainment. Visualisation cognitions can act as a lubricant that guides progression through post-decisional, pre-behavioural stages. The cognitive level thus reflects the self-regulatory processes that mediate between the intentions and the actions.

When behaviour is initiated, maintaining it requires meta-cognitive activity to deal with competing intentions that may become dominant while the behaviour is being performed. Maintaining an exercise regime requires self-regulation of effort and persistence to avoid over-eating and other motivational tendencies not conducive to the regime goal. The optimistic or pessimistic sense of self-efficacy determines the effort and perseverance in the face of obstacles.

In addition to intentions and cognitive control, the perceived and actual environment presents as an influence on actions. Social surroundings, for example, may be ignorant of a person's coping process, thereby taxing his or her volitional strength.

### **2.3 Theory of Reasoned Action (TRA)**

The Theory of Reasoned Action (Ajzen & Fishbein, 1977) was developed to provide a framework to study attitudes towards behaviours. The theory posits that the immediate antecedent to an individual's behaviour is their intention to perform that behaviour. This 'behaviour intent' is a function of an attitude towards the behaviour, and the perception of others' attitudes towards the behaviour (subjective norms). An individual's attitude towards a particular behaviour is a result of their most salient belief of the likely positive or negative outcome of that behaviour. For example, if an individual's perception of performing a particular behaviour is positive (i.e. they have positive salient beliefs about the outcome of engaging in that behaviour), then he or she will have a positive attitude toward performing that behaviour. Subjective norms are a function of normative beliefs (perceptions about how others will perceive the outcome of the behaviour) and the motivation to comply (degree to which normative beliefs influence whether the behaviour is carried out). It is important to note that subjective norms are formed only in relation to the opinions of persons considered to be significant or important.

The primary limitation of the TRA is that it does not explain behaviour that is not under volitional control (such as irrational decisions, habitual actions, or behaviour interrupted by environmental factors). For example, individuals who are likely to vary their

behaviour depending on the situation (termed high self-monitors) do not always act on the intentions they have, are not explained by the TRA (Ajzen, Timko, & White, 1982). The updated version of the model, the Theory of Planned Behaviour encapsulates all the aspects of the TRA.

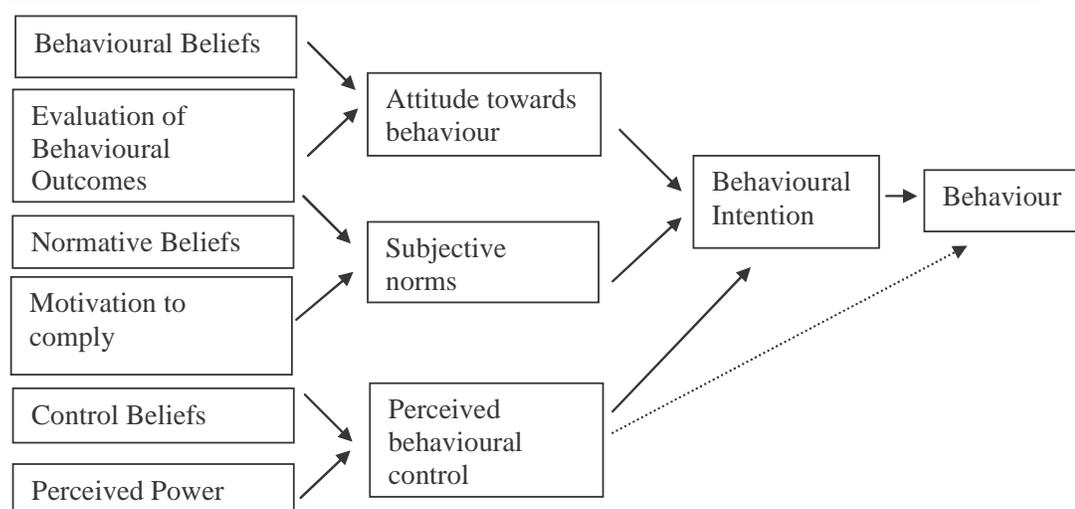
## **2.4 Theory of Planned Behaviour (TBP)**

Addressing the limitation of explanatory power in non-volitionally controlled contexts, Ajzen introduced the notion of Perceived Behavioural Control to the TRA, thereby creating the Theory of Planned Behaviour (Schifter & Ajzen, 1985).

Re-capping on the central tenants of the theory, behaviour is best predicted by a person's overt statement of intention. Intention consists of attitude (general affective and cognitive orientation toward the behaviour), subjective norm (the perceived pressure placed on them by significant others to participate in the target behaviour), and perceived behavioural control (their competence-related evaluation of their faculties and capacities toward the behaviour).

Perceived behavioural control suggests intention is influenced by a person's assessment of their capacities (e.g. skills and abilities) and the limiting or facilitating factors (e.g. barriers and access to facilities) regarding behavioural engagement. These individual assessments are denoted in the model as perceived power and control beliefs respectively. One inference of the construct is that strong intentions toward a given behaviour are not likely to form should resources or opportunities to perform the behaviour be perceived as lacking. This is case even if attitudes towards the behaviour and subjective norms are positive. As indicated in Figure 2, perceived behavioural control is able to influence behaviour directly or indirectly through behavioural intentions. It is a direct antecedent of behaviour when actual control over behaviour is accurately received.

**Figure 2:** The Theory of Planned Behaviour



The theory of planned behaviour has been employed successfully in behaviour and intention predictions (Armitage & Conner, 2001). As with all existing behaviour theories, it does not provide a complete account. In line with this observation, a number of additions and refinements of the basic model have proven to increase conceptual and empirical integrity.

The theory of planned behaviour does not take into account factors such as personality and demographic variables. The introduced concept, perceived behavioural control has been subject to ambiguity regarding its definition, and its relation to actual behavioural control has been questioned. Of course, in contrast to the theory of reasoned action, TPB only works when some aspect of the behaviour is not under volitional control. Because it is not a stage theory, it does not maintain a strong relation between behavioural intent and behaviour the longer the time interval between the two.

The TPB has been used to predict and understand intentions, behaviours and intervention outcomes in a wide range of contexts (Conner & Armitage, 1998, Sutton, 1998). It offers a systematic approach to the construction of the content of a health education message. In the field of health, areas that the TPB has been applied to include voluntary adoption of medication programs (Conner, Black, & Stratton, 1998), exercise behaviour (Nguyen, 1997; Kimiecik, 1992; Blanchard, Courneya, Rodgers, Daub, & Knapik, 2002), eating behaviour (Baker, Little, & Brownell, 2003), safe sex strategies (Bryan, Fisher & Fisher, 2002; Sheeran & Taylor 1999), the utilisation of safety equipment (Quine, Rutter, & Arnold, 1998; Trafimow & Fishbein, 1994), driving behaviour/ regulatory compliance with speed limits (Parker, Manstead, Stradling, Reason, & Baxter, 1992; Elliott, Armitage, & Baughan, 2003), and behaviour of physicians (Millstein, 1996).

The theory of planned behaviour has been used in other contexts to examine environmentally related behaviours including environmental attitudes and decision-making (Cordano & Frieze, 2000), green consumerism (Sparks & Shepherd, 1992), disaster preparedness (Paton, Smith and Johnston, 2000), and environmental policy (Bright, 1993).

The theory has also been used in relation to ethical & moral behaviour (Kurland, 1995; Bobek & Hatfield, 2003), study intentions (Davis, Ajzen, Saunders, Williams, 2002) and collective political action (Hinkle, Fox-Cardamone, Haseleu, Brown, & Irwin, 1996; Kelly & Brienlinger, 1995).

## **2.5 Health Belief Model (HBM)**

The Health Belief model (Janz & Becker, 1984) examines the predictors and precursors to health behaviours in terms of cognitive factors. It is one of the most commonly used health models, and offers an understanding of how to design health education programs and persuasive messages. According to the model, the adoption of behaviour depends on firstly, the motivation to engage in fear-reduction when a person feels personally susceptible to a threat with serious consequences, and secondly, the belief a person holds that the benefits of taking the preventive action outweigh the perceived barriers to (and/or costs of) preventive action.

The HBM suggests that individuals weigh the potential benefits of the recommended response against the psychological, physical, and financial costs of the action (the barriers) when deciding to act. The basic cognitive elements are perceived threat, perceived benefits and perceived barriers. Revised forms of the model have also included self-efficacy as a construct. Perceived threat contains two sub-components, perceived susceptibility and perceived severity. Perceived susceptibility refers to the subjective perception of a risk of contracting a health condition. Perceived severity is understood in terms of the feelings concerning the seriousness of contracting an illness or of leaving it untreated. Perceived benefits are the believed effectiveness of strategies designed to reduce the threat of illness. Perceived barriers are the potential negative consequences that may result from taking particular health actions, including physical, psychological, and financial demands.

Perceived susceptibility, severity, benefits and barriers are affected by an individual's demographics and prior experiences. They are also influenced by 'cues to action', which may be external (such as television shows or mass mailings), or internal (such as illness symptoms). They are posited to increase perceptions of susceptibility and severity, and in turn trigger the decision-making process whereby perceived barriers and benefits are weighed against each other.

According to the tenets of the model, health protective behaviour is adopted depending on the extent an individual perceives themselves to be susceptible to a health threat, perceive the threat consequences to be severe, perceive the benefits of the proposed health action for mitigating the threat, and perceive an ability to overcome barriers to the health behaviour (Jackson & Aiken, 2000). Rosenstock (1974) identified motivation for action to be a product of perceived susceptibility and severity, whilst perceived benefits to perceived barriers provide the means or pathway to action. The implication is that greater severity, susceptibility, and benefits perceptions, combined with weaker perception of barriers, produce an increased likelihood in health-protective actions.

The Health Belief model has been criticised for its lack of explanation of environmental and social factors, owing to its emphasis on the individual. Nevertheless, perceived barriers have been indicated as strong predictors of health-protective behaviour, as has perceived susceptibility (Janz & Becker, 1984).

It's applications as the basis for educational campaigns on a number of behaviors include bicycle helmet use (Witte, Stokols, Ituarte, Schneider, 1993), adolescent fertility control (Eisen, Zellman, & McAlister, 1985), and risky sexual practices (Vanlandingham, Suprasert, Grandjean, & Sittirai, 1995).

## **2.6 Protection Motivation Theory (PMT)**

Protection Motivation Theory (Rogers, 1975; Maddux & Rogers, 1983) is what is also known as a value-expectancy theory. The theory advocates that behaviour is a direct function of an individual's motivation to protect his or herself. It incorporates the constructs (perceived susceptibility, perceived severity, perceived effectiveness and perceived barriers) from the Health Belief Model, extending them by juxtaposing adaptive against maladaptive responses to health threat. It also specifies that perceptions of susceptibility and severity lead to fear arousal, which, in turn, reduces the probability of maladaptive responses. The theory further differs (from the original form of the health belief model) in the addition of a fifth factor, self-efficacy, which was included based on the observation that initiating actual behaviour change requires more than the existing factors.

Recapping, the first four factors are as follows: perceived susceptibility is a person's estimation of vulnerability to a certain negative health event; perceived severity is the estimation of the severity should that health event arise; perceived effectiveness is the belief of enacting a behaviour to reduce the threat; and perceived barriers are the obstacles believed to be present that would prevent taking threat-avoidance action. Self-efficacy refers to "expectancy of one's capability to execute the recommended course of action successfully" (Melamed, Rabinowitz, Feiner, Weisberg, & Ribak, 1996).

The theory posits two sources of information that incite behaviour responses, environmental (e.g. verbal persuasion, observational learning) and intrapersonal (e.g. prior experience). A source of fear, such as a health threat message for example, will initiate both threat appraisal (risk perceptions), and coping appraisal (perceived effectiveness in overcoming barriers) (Sturges & Rogers, 1996). The coping response will either be adaptive (i.e. the intention to improve one's health) or maladaptive (e.g. avoidance, denial).

The protection motivation theory is similar to the health belief model and it is exposed to similar criticisms. It does not, for example, include roles for social and environmental factors, such as what other people's attitudes may be, or what opportunities to enact healthy behaviour may exist. Another primary concern is the theory's apparent lack of consideration of attitude change (Schwarzer, 1992).

Protection Motivation Theory has been successful in predicting cancer-screening (Rippetoe & Rogers, 1987) exercise (Wurtele & Maddux, 1987), and dental care behaviour intentions (Beck & Lund, 1981).

## **2.7 The Extended Parallel Process Model (EPPM)**

An area of research known as 'fear appeal' examines the effectiveness of risk messages. Fear appeals are persuasive messages that frighten an audience into adopting a recommended response. Many educational campaigns increase fear (intentionally or unintentionally) in target groups through focusing on a health, physical, or social risk.

The Extended Parallel Process Model (Witte, 1992) is essentially an explanatory version of the Health Belief Model. It posits that the evaluation of a threat initiates two appraisals, which result in either danger control or fear control processes. The seriousness and perceived susceptibility are the constituents of threat appraisal, with greater perceived threat initiating increased motivation to evaluate response and self-efficacy levels. When both perceived threat and perceived efficacy are high, then individuals will be motivated to control the danger and adopt the recommended response.

Danger control processes can initiate positive approaches to dealing with threat, where an individual feels capable of effectively deterring the threat. These processes result in adaptive (rather than maladaptive) actions such as attitude, intention, or behaviour changes. If, however, a person believes they cannot avoid the threat, then fear control processes will begin to dominate over danger control processes. This means the primary response will be directed at coping with fear rather than apparent danger, and can result in maladaptive behaviour such as risk denial, defensive avoidance.

In sum, the model highlights the role of threat in motivating action, in which perceived efficacy influences the adoption of danger controlling (adaptive) or fear controlling (maladaptive) responses. The implication is that if an educational message presents a strong threat (i.e. highly fear-arousing), it should be accompanied by high efficacy messages or else it may be rejected.

## **2.8 Transtheoretical Model of Change (TTM)**

The most widely used stage model in health psychology, the Transtheoretical Model (Prochaska, DiClemente, & Norcross, 1992) states varying degrees of readiness or actual involvement in the behaviour change process are exhibited by all people, see Figure 3. It postulates that the cessation of high-risk behaviours and the acquisition of healthier alternatives involve progression through five stages of change.

The five stages are:

- (a) Precontemplation (i.e., those people not thinking about changing their behaviour)
- (b) Contemplation (i.e., those people who are thinking about changing their behaviour sometime within the next six months)
- (c) Preparation (i.e., those people who have decided to or are attempting to change their behaviour);
- (d) Action (i.e., those people who have overtly changed their behaviour, but for less than six months); and
- (e) Maintenance (i.e., those people who have overtly changed their behaviour and maintained these changes longer than six months).

Thus, behaviour is categorised based on a person's past behaviour and his or her plans for future action (Prochaska et al., 1992). Progressing through the stages would normally be sequential, though relapse and repeat attempts to change may occur, resulting in "a spiral-like progression through the behaviour-change process" (Prochaska et al., 1992).

The framework of stages enables messages to be designed according to the stages in which the target audience are located. For example, if campaigners wish to design a campaign to promote a new service and they determine that the majority of the target population are in the Contemplation stage, they can design messages to systematically move audience members through the Preparation, Action, and Maintenance stages. Similarly, if the majority of the target audience is in the Maintenance stage, educators can provide messages, which reinforce and support the desired behaviour (Weinstein, 1988).

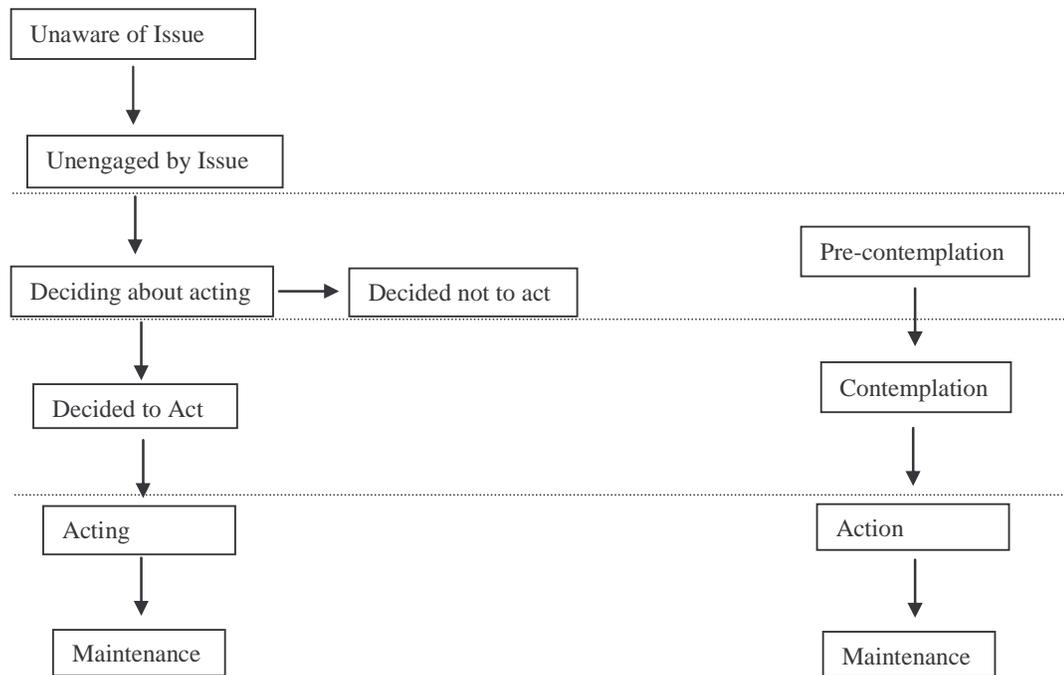
The model has been applied to a range of health related behaviours including alcohol use, safe sex behaviours, smoking cessation, exercise adoption and cancer screening (e.g., Prochaska et al., 1992).

## **2.9 Precaution Adoption Process Model (PAPM)**

The Precaution Adoption Process Model (Weinstein, 1988; Weinstein & Sandman, 1992) is similar to the transtheoretical model (see Figure 3). It posits that in deciding to act in a certain manner, people progress through seven stages. Initially, people are unaware of an issue (stage 1). Following this, they become aware of the issue, though are not engaged personally (stage 2). When a person becomes engaged in the issue, they reach a decision-making stage (stage 3). This may result in the decision to take no action, ending the process (stage 4), or an intention to adopt cautious behaviour (stage 5). To engage in precautionary behaviour (stage 6) is essentially the end of the process. However, a maintenance stage (stage 7) may be relevant in cases where the behaviour needs to be continued over time.

The distinction in the 'precontemplation stage' between people unaware of an issue (stage 1) and those aware but not considering action (stage 2) is an important one in instances where hazards have only recently been recognised or there are additional possible precautionary behaviours available (Weinstein and Sandman, 1992). The model also varies from the transtheoretical model in that people making decisions not to change behaviour (stage 4) are differentiated from those who do not change because they are not aware they may need to (stages 1 & 2).

**Figure 3:** Precaution Adoption Process Model    Transtheoretical Model



Once people are aware of a hazard, perceptions of personal vulnerability are suggested to be highly influential in adopting precautionary action (i.e. moving from stage 3 to 5). To actually act out a behaviour based on intentions to do so is likely to be highly dependent on situational obstacles. It is also suggested that the influence of peers is present at several stages, where people reach decisions by utilising behaviour and attitudes of others as well as their own attitudes.

### **3. Summary of common behavioural themes**

Influences on human behaviour can be understood in terms of macro-level factors that are roughly equivalent for all people, and micro-level factors that tend to vary between people. Environmental influences, which largely determine behavioural options, are macro-level factors. Human needs and values, abilities and uncertainty are the fundamental micro-level determinants of behaviour. These two levels are interdependent. Natural environment (resources such as natural forests and fish stocks) represent the opportunities that people, as consumers, can choose from. The consumption of a community, in turn, affects the resources available to them. Environmental problems, such as the loss of bio-diversity, are affected by human-induced, macro-level processes.

Motivation to elaborate on, or 'consume' opportunities are determined by levels of need satisfaction (derived from needs and opportunity consumption), behavioural control (derived from ability and opportunity), and uncertainty. These factors are the most robust determinants of the type of cognitive processing a person is likely to engage in. Consequently, in terms of identifying effective educational strategies, behavioural models generally focus on the variables of threat, efficacy, and barriers to behaviour change.

A threat is a possibly harmful situation that people may or may not be aware of, such as a lack of pertinent information about an environmental problem, or an undiagnosed serious illness. It is comprised of severity, which is the seriousness of the threat, and susceptibility, which is the degree of vulnerability, personal relevance, or risk of experiencing a threat.

The effectiveness, feasibility and ease of impeding or averting a threat with a recommended response is one's efficacy. It is comprised of response efficacy and self-efficacy. Response efficacy, often denoted 'outcome expectations' in the behavioural models, refers to how effectively an individual's performance of the recommended response averts a threat. As presented in Bandura's social cognitive theory, self-efficacy is a person's perception of how well they can perform the recommended response.

Any factor that inhibits a person's perceived ability to enact a recommended response is described as a barrier, and these may be viewed as the opposite of self-efficacy. Common barriers include perceived cost of carrying out certain behaviours, and communication problems such as confusing educational messages.

Fear is a natural response to a threat that is deemed significant and personally relevant, and can be one of the most powerful influences on behaviour. It may motivate protective behaviour, such as seeking out helpful information, or maladaptive actions, such as denial leading to avoidance of recommended responses.

The theories generally emphasise people's risk appraisal in terms of subjective expectancies and perceived psychological costs prior to engaging in behaviour. More specifically, the perception of potentially harmful or beneficial consequences influences behaviour. For example, anticipation of a negative health outcome and the desire to avoid this outcome or reduce its impact creates motivation for self-protection. The impact of a negative outcome on the motivation to act also depends on beliefs about the likelihood that this outcome will occur. Underestimation of risk has been found in a variety of instances, including health related issues (heart disease, cancer, alcoholism etc.) and motor vehicle crashes (Kreuter & Strecher, 1995). People that tend to underestimate risk are less likely to engage in risk-reducing strategies. Optimistic risk biases are positively correlated with perceived controllability and negatively correlated with past experience.

The concept of efficacy (self) is also emphasised among the models. In some instances it is explicitly labelled, as in self-efficacy (social cognitive theory, health belief model), or implicitly as in perceived behavioural control (theory of planned behaviour). For example, low self-efficacy is highlighted as one of the most powerful behaviour change barriers, as it has long been recognised as an essential determinant of effort and persistence (Bandura, 1977).

Response efficacy is also a key focus of the models, denoted as outcome expectations in social cognitive theory and theory of planned behaviour, and as perceived benefits and barriers in the health belief model. The theories assume that the expected benefits in risk reduction must be weighed against the expected costs of acting to predict changes in behaviour.

The role of social influences features prominently among the models, as in concepts of observational learning (social cognitive theory), and perceived norms (theory of reasoned action and theory of planned behaviour). The importance of social influences suggests that other people's behaviour and attitudes are often used in reaching decisions about behaviour.

Cognitive processing may be differentiated based on what source of information is the main focus. Individual processing is that undertaken with minimal consideration to the behaviour of others. Social processing involves utilising observation of other people's behaviour as a source of identifying attractive behaviour opportunities.

Individual processing is stimulated by: certainty of the availability and need-satisfying capacity of opportunities, low visibility of others' behaviour, cultural perspective and identity (such as low group belonging), and individually relevant needs. Social processing tends to occur when opportunities or perceived outcomes are uncertain, other people's behaviour is highly visible such that norms on appropriate behaviour are prevalent, cultural identity is socially oriented, and needs are more social (such as the need for identity).

## **4. Communication models**

### **4.1 Message Framing**

Educational media campaigns designed to promote behaviour change often target salient beliefs, as these are precursors to attitudes. Behavioural interventions, on the other hand, often explicitly target attitudes themselves, seeking to change people's evaluations of their behaviour. Whether the information provided is about harmful or positive consequences of behaviours, the idea is to implicitly or explicitly attempt behaviour change through attitude change. An understanding of attitude concepts is invaluable to educational endeavours, and behaviour theories offer insight into the impact of this construct on behaviour.

Messages may be conveyed in terms of benefits (gain frame) or in terms of costs (loss frame). Rothman and Salovey (1997) indicated that, although these frames refer to objectively equivalent situations, they have different effects on individuals' judgments, decisions, and behaviours. They described four types of messages frames, emphasising two dimensions that underlie the message: the specified behaviour's action (attain vs. not attain) and its outcome (desirable vs. undesirable). Tversky & Kahneman (1981) suggested, in their prospect theory, that individuals are risk seeking in the domain of losses and risk averse in the domain of gains. The combined observations resulted in two predictions: a message that focuses on the losses associated with failing to perform a risky behaviour should be more effective than a message focusing on potential gains; and, a message that focuses on the gains associated with performing a behaviour not perceived as risky should be more effective than a loss-framed message.

## **4.2 Approach and Avoidance Motivations in Message Framing**

The two motivational systems (for reviews, see Carver, Sutton, & Scheier, 2000) posited to be involved in the regulation of behaviour are the approach (such as behavioural activation system, BAS) and avoidance (such as behavioural inhibition system, BIS) systems. The former controls appetitive motivation, and the latter controls aversive motivation. People with high BAS sensitivity are more responsive to incentive cues, and those with high BIS sensitivity are highly responsive to punishment or threat cues (Carver et al., 2000).

People with strong approach motivation are biased toward positively framed cues, and individuals with strong avoidance motivation are biased toward negative cues. Evidence indicates gain-framed messages are more persuasive with a person who is predominantly approach oriented, and a loss-framed messages are more persuasive with a person who is predominantly avoidance oriented (Mann, Sherman, Updegraff, 2004).

Approach/avoidance motivation can also influence goal selection and strategies for reaching goals, which are essential components of the process of behaviour change. Thus, health messages congruent with individuals' approach/avoidance orientation will be more effective in initiating behaviour change.

## **4.3 Elaboration Likelihood Model (ELM)**

Among the most widely used and accepted theories of attitude change is Petty and Cacioppo's (1979) elaboration likelihood model. It posits that the nature of attitude formation and change is dependent on whether the information is processed by a central or peripheral route. Supported by many empirical studies is the central tenet that the more personally relevant information is perceived to be, the more thoughtful the processing of it will be.

An individual with a high motivation to attend the information will likely process it through the central route. Motivation is generally higher when people are involved in the issue, or the information is incongruent with their existing knowledge and attitudes. The central route involves a substantial degree of thought as either favourable or unfavourable responses to the message are generated. This elaboration of information that occurs in the central route typically results in more firmly held beliefs and lasting attitude change. In contrast, the peripheral route is utilised when interest in the information is not at a premium, or an inability to comprehend the message exists. Decision-making is more heavily guided via the use of association, such as rewards or punishment, or cues, such as source attractiveness or perceived credibility. Information is processed using mental short cuts, or heuristics, which require less mental energy and therefore save time. The

reduced cognitive attention results in less strongly formed attitudes that tend to last only so long as the associations or cues are present or recallable. Thus, an individual's motivation and ability are the primary determinants of whether the central or peripheral route is utilised in response to a persuasive message.

In sum, central route attitudes are based on message content, are mediated by subjects' message-relevant thinking, persist over time, and are predictive of behaviour. However, peripheral route attitudes are based on context cues such as source credibility or likeability, are not mediated by subjects' message-relevant thinking, do not persist as long, and are less predictive of behaviour, compared to central route attitudes.

The implication is that people who are motivated and cognitively aware of the content of a persuasive message are likely to be persuaded by a central route process. In contrast, unmotivated people who are ignorant of or unable to process the message content are more likely to be persuaded by a peripheral route process.

As Kreuter, Bull, Clark and Oswald (1999) infer:

- a) superfluous information is eliminated
- b) information that remains is more personally relevant to the recipient
- c) more attention is paid to information perceived as relevant
- d) relevant information that is attended to will lead to more thoughtful consideration of specific factors that could facilitate or hinder behaviour change
- e) such relevant information when thoughtfully processed will be more useful in helping to enact behavioural changes.

Communicating risk effectively depends on strong emphasis between behaviour and susceptibility, clearly presented specific behavioural objectives, and descriptions of the preventive actions of others (Weinstein, 1988).

Adopting behaviour is influenced by the observed and anticipated benefits, the functional value of the information presented, as well as the perceived risks. Message framing can influence the perception of all these factors underlying behaviour change. Social barriers and environmental inducements are also determinants of whether certain behaviours will be performed. Health education programs consisting of predisposing, reinforcing and enabling factors will be more successful in bringing about behaviour change.

Stage models indicate the utility of tailoring persuasive strategies to particular stages of behaviour that target audiences are in. People that are unaware of a particular issue, that are in the "precontemplation" stage, would be best targeted by a campaign heightening awareness and knowledge of the issue. Once people become aware of an issue, persuading them to prepare and engage in action would be best obtained with a motivational campaign.

Persuading people to abandon their concern of a hazard is as difficult as engaging people who are apathetic towards it. Once people have taken a position on an issue, they are more resistant to persuasion. Because of this, attempting to change people's attitudes often leads to aversive reactions to messages, and can result in outrage among the community.

## **5. Community outrage**

In the context of biosecurity utilisation, risk consists of a technical component, 'hazard', and a non-technical, behavioural component, 'outrage'. Identifying and dealing with the magnitude, probability and uncertainty of hazards is largely a matter of biological and technological innovation. Quantifying and dealing with community outrage, which is a function of factors such as voluntariness and control, requires an examination of behavioural responses to hazards. Anger and disapproval are generally the major components of outrage, but fear may also be a fundamental component in certain circumstances.

Magnitude, probability and uncertainty are the fundamental factors driving not only the actual existence of hazards, but also outrage. In terms of outrage, magnitude and probability reflect the notions of perceived severity and likelihood of threats exhibited in many behaviour theories. Uncertainty appears to polarise people's reaction to hazards, whatever their initial level of concern.

In accordance with behaviour theories such as Bandura's social cognitive theory, people feel less threatened when they perceive a greater array of options available to avert hazards. Engaging in precautionary behaviour significantly reduces anxiety stemming from uncertainty through providing people with a strong sense of control. As expressed through behaviour theories, uncertainty is reduced through the presence of stronger feelings of self-efficacy. Providing people with a sense of control reduces their uncertainty, and thereby reduces their outrage.

As suggested by various behaviour theories, this phenomenon holds regardless of whether the precautionary behaviour adopted is effective or not, and whether the hazard is serious or not. What matters is the perception of feeling in control. Thus, increasing feelings of self-efficacy can reduce outrage regardless of perceived severity and likelihood of a hazard.

Owing to the greater exercise of control and decision-making involvement, voluntary behaviour is more reassuring in the face of hazards than forced compliance. Forced compliance increases the demand of involvement, but reduces control, thereby increasing outrage, even if uncertainty is reduced through the forced involvement.

While precaution taking should depend on the magnitude and uncertainty of a hazard rather than the voluntariness of people at risk, increasing the voluntary nature of risks where possible is essential for managing outrage. Because people's perceptions of control are reduced in coercive situations, it is logical to adopt more conservative approaches to coercive precautions than voluntary ones.

Activist groups often appeal to people's outrage more than the nature of the actual hazard to gain interest. It is important to note, however, that if the presentation of a hazard is too effective (i.e. the risk is presented too frequently or dramatically), it may actually frighten people out of engaging in precautionary behaviour in order to avoid facing their fear. This kind of event features prominently in instances involving high personal risk. One well-documented case in the literature is cancer screening among women. Risk messages have been presented so strongly in some instances, that some women, through being so fearful of detecting the presence of a tumour, have avoided performing the precautionary behaviour altogether (Drossaert, Boer, & Seydel, 2001).

As indicated above, the most effective reductions of outrage are when individuals themselves, rather than governments or companies, engage in precaution taking. Consequently, educational interventions should seek to align with people's impulse towards self-protection, rather than confront them.

## **5.1 Cognitive Dissonance**

Cognitive dissonance refers to the uncomfortable sensation people feel when they are exposed to information that conflicts with their existing beliefs. This psychological phenomenon often results in cognitive strategies such as seeking out information in support of the existing view, misinterpreting or misremembering the discrepant information, or discounting the source of the challenging information.

The phenomenon suggests that all kinds of communication are more likely to confirm the information in the minds of those who already agree, and less likely to alter the position of those who disagree. In the context of communicating information about a

hazard, a message seeking to reassure the public about risks will likely reinforce the lack of concern for those unconcerned, and have little effect on reducing the worries of people who are highly concerned. Thus, a vague communication message, where neither side of an argument is dominant, is the most likely to be supported by both strongly and scarcely involved people.

When people become concerned or apathetic towards a hazard, they remain attached quite strongly to their attitude. As a defence against cognitive dissonance, they view educational messages as attempts to prove them wrong rather than make them safe. As outrage increases, resistance to persuasion increases. Simply, outraged people resist information that threatens to undermine their outrage. This occurs even if the hazard is minimal but outrage has built up about it within a community.

A further problem is that, in cases where acceptance of information or policy is forced, rather than adopted, people maintain their outrage through finding new reasons, and thus outlets, for it. Whilst people feel upset because of a serious risk, the stronger effect is that they perceive a risk to be serious because they are upset. Changing attitudes about hazards is an important aspect of managing risk, but addressing people's outrage is equally important in managing such risk.

Risk education that minimalises outrage therefore depends on a number of factors. Information should be presented in a balanced manner, and give merit to both sides of an issue. It should be respectful of people's concerns, particularly on highly emotional issues. Where possible, people should feel that they have some control over their response to an issue. Where the nature of a hazard is uncertain this should be acknowledged, as omitted information and over-confidence may incite a strong negative reaction to persuasive messages. It is also important to understand the knowledge of an issue the target audience possesses, so the initial information presented is of the appropriate nature.

## 6. References

- Ajzen, I. (1991). The Theory of Planned Behaviour. *Organizational Behavior and Human Decision Processes*, 50, 179-211.
- Ajzen, I., Timko, C. & White, J. B. (1982). Self-monitoring and the attitude-behavior relation. *Journal of Personality and Social Psychology*, 42, 426-435.
- Ajzen, I., & Fishbein, M. (1977). Attitude-behavior relations: A theoretical analysis and review of empirical research. *Psychological Bulletin*, 84, 888-918.
- Anderson, Eileen S., Winett, Richard A., & Wojcik, Janet R. (2000). Social-Cognitive Determinants of Nutrition Behavior Among Supermarket Food Shoppers: A Structural Equation Analysis. *Health Psychology*, 19, No. 5, p 479-486.
- Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology*, 40, 471 - 499.
- Armitage, C.J. and Conner, M. (1999). Distinguishing perceptions of control from self-efficacy: Predicting consumption of a low fat diet using the Theory of Planned Behaviour. *Journal of Applied Social Psychology*, 29, 72-90.
- Baker Christina W., Little, Todd, D., & Brownell, Kelly, D. (2003). Predicting Adolescent Eating and Activity Behaviors: The Role of Social Norms and Personal Agency. *Health Psychology*. Vol. 22, No. 2, p 189-198.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215
- Bandura, A. (1986). *Social foundations of thought and action: A social-cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Bandura, A. (2001). Social Cognitive Theory: An Agentic Perspective. *Annual Review of Psychology*, 52:1-26.
- Beck, K.H. & Lund, A.K. (1981). The effects of health threat seriousness and personal efficacy upon intentions and behavior. *Journal of Applied Social Psychology*, 11 (5), 401-415.
- Bishop Rosean M., & Bieschke Kathleen J. (1998). Applying Social Cognitive Theory to Interest in Research Among Counseling Psychology Doctoral Students: A Path Analysis. *Journal of Counseling Psychology*, Vol. 45, No. 2, p 182-188.

- Blanchard, Chris M., Courneya, Kerry S., Rodgers, Wendy M., Daub, Bill, Knapik, Grant. (2002). Determinants of Exercise Intention and Behavior During and After Phase 2 Cardiac Rehabilitation: An Application of the Theory of Planned Behavior. *Rehabilitation Psychology Vol. 47*, No. 3, p 308-323.
- Bobek, Donna D., Hatfield, Richard C. (2003). An investigation of the Theory of Planned Behavior and the role of moral obligation in tax compliance. *Behavioral Research in Accounting, Annual* p13(26).
- Bright A. D. (1993). Application of the theory of reasoned action to the national park service's controlled burn policy. *Journal of Leisure Research, 25*(3), 263-281.
- Bryan, Angela, Fisher, Jeffrey D., & Fisher, William A. (2002). Tests of the Mediational Role of Preparatory Safer Sexual Behavior in the Context of the Theory of Planned Behavior. *Health Psychology, Vol. 21*, No. 1, p 71-80.
- Carver, C.S., Sutton, S.K., & Scheier, M.F. (2000). Action, emotion, and personality: Emerging conceptual integration. *Personality and Social Psychology Bulletin, 26*, 741-751.
- Conner, M. & Armitage C. J. (1998). Extending the theory of planned behavior: a review and avenues for further research. (Expectancy-Value Models of Attitude and Behavior) *Journal of Applied Social Psychology, v28 n15 p.1429*(36).
- Conner, M., Black, K., & Stratton, P. (1998). Understanding drug compliance in a psychiatric population: An application of the Theory of Planned Behaviour. *Psychology, Health & Medicine, 3*(3), 337-344.
- Cordano, Mark, and Frieze, Irene Hanson. (2002) Pollution Reduction Preferences of US Environmental Managers: Applying Ajzen's Theory of Planned Behavior. (How attitudes of managers affect their decisions). *Academy of Management Journal,, 43*(4) p627.
- Davis, Larry E., Ajzen Icek, Saunders Jeanne, Williams, Trina. (2002). The Decision of African American Students to Complete High School: An Application of the Theory of Planned Behavior. *Journal of Educational Psychology, Vol. 94*, No. 4, p 810-819
- Drossaert, C.H.C., Boer, H., and Seydel, E.R. (2001). Does mammographic screening and a negative result affect attitudes towards future breast screening? (Statistical Data Included). *Journal of Medical Screening v8 i4 p204*(9).
- Dzewaltowski, D. A. (1989). Toward a model of exercise motivation. *Journal of Sport & Exercise Psychology, 11*, 251-269.

- Eisen, M., Zellman, G.I., & McAllister, A.L. (1985). A health belief model approach to adolescents' fertility control: Some pilot program findings. *Health Education Quarterly*, 12, 185-210.
- Elliott, M. A., Armitage, C. J., & Baughan, C. J. (2003). Drivers' compliance with speed limits: An application of the theory of planned behavior. *Journal of Applied Psychology*, 88, 964-972.
- Fouad, Nadya A., & Smith Philip L. (1996). A Test of a Social Cognitive Model for Middle School Students: Math and Science. *Journal of Counseling Psychology*, Vol. 43, No. 3, p 338-346.
- Graves, Kristi D., (2003). Social Cognitive Theory and Cancer Patients' Quality of Life: A Meta-Analysis of Psychosocial Intervention Components. *Health Psychology*, Vol. 22, No. 2, p 210-219.
- Griffin, R. J., Neuwirth, K., & Dunwoody, S. (1995). Using the theory of reasoned action to examine the health impact of risk messages. *Communication Yearbook* 18, 201-228.
- Hinkle Steve, Fox-Cardamone Lee, Haseleu Julia A., Brown Rupert, Irwin Lois M. (1996). Grassroots political action as an intergroup phenomenon. *Journal of Social Issues*, 52(1) p39(13).
- Jackson, Kristina M., Aiken, Leona S. (2000). A Psychosocial Model of Sun Protection and Sunbathing in Young Women: The Impact of Health Beliefs, Attitudes, Norms, and Self-Efficacy for Sun Protection. *Health Psychology*, Vol. 19, No. 5, p 469-478
- Janz, N. K. & Becker, M. H. (1984). The health belief model: A decade later. *Health Education Quarterly*, 11, 1-47.
- Kelly, C., & Brienlinger, 5. (1995). Attitudes, intentions, and behavior: A study of women's participation in collective action. *Journal of Applied Social Psychology*, 25: 1430-1445.
- Kimiecik, J. (1992). Predicting vigorous physical activity of corporate employees: Comparing the theories of reasoned action and planned behavior. *Journal of Sport and Exercise Psychology*, 14, 192-206.
- Kohlberg, L. (1969). Stage and sequence: The cognitive-developmental approach to socialization. In D. A. Goslin (Ed.), *Handbook of socialization theory and research* (pp. 347-480). Chicago: Rand McNally.
- Kreuter, Matthew W. & Strecher, Victor J. (1995). Changing Inaccurate Perceptions of Health Risk: Results from a Randomized Trial. *Health Psychology*, Vol. 14, No. 1, p 56-63.

- Kreuter, M. W., Bull, F. C., Clark E. M., & Oswald, D. L. (1999). Understanding How People Process Health Information: A Comparison of Tailored and Nontailored Weight-Loss Materials. *Health Psychology, Vol. 18*, No. 5, p 487-494
- Kurland, N. B. (1995). Ethical intentions and the theories of reasoned action and planned behavior. *Journal of Applied Social Psychology, 25*: 297-313.
- Lent, R. W., Brown, S. D. & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior, 45*, 79-122.
- Maddux, J. E. & Rogers, R. W. (1983). Protection motivation and self-efficacy: A revised theory of fear appeals and attitude change. *Journal of Experimental Social Psychology, 19*, 469-479.
- Mann, T., Sherman, S., Updegraff J. (2004). Dispositional Motivations and Message Framing: A Test of the Congruency Hypothesis in College Students. *Health Psychology, Vol. 23*, No. 3, 330–334.
- Melamed S., Rabinowitz, S., Feiner, M., Weisberg, E., & Ribak, J. (1996). Usefulness of the Protection Motivation Theory in Explaining Hearing Protection Device Use Among Male Industrial Workers. *Health Psychology, Vol. 15*, No. 3, p 209-215.
- Miller, Suzanne M., Shoda Yuichi, Hurley Karen. (1996). Applying Cognitive–Social Theory to Health-Protective Behavior: Breast Self-Examination in Cancer Screening. *Psychological Bulletin*, Vol. 119, No. 1, p 70-94.
- Millstein, Susan G., (1996). Utility of the Theories of Reasoned Action and Planned Behavior for Predicting Physician Behavior: A Prospective Analysis. *Health Psychology. Vol. 15*, No. 5, p 398-402.
- Nauta, Margaret M., & Epperson, Douglas L. (2003). A Longitudinal Examination of the Social-Cognitive Model Applied to High School Girls' Choices of Nontraditional College Majors and Aspirations. *Journal of Counseling Psychology, Vol. 50*, No. 4, p 448-457.
- Nguyen, M. N. (1997). Regular exercise in 30- to 60- year old men: combining the stages-of-change model and the theory of planned behavior to identify determinants for targeting heart health interventions. *Journal of Community Health, 22*(4), 233-247.
- Parker, Dianne, Manstead, Antony S. R., Stradling, Stephen G., Reason, James T., & Baxter, James S. (1992). Intention to Commit Driving Violations: An Application of the Theory of Planned Behavior. *Journal of Applied Psychology, Vol. 77*, No. 1, p 94-101.

- Petty, R. E. & Cacioppo, J. T. (1979). Issue involvement can increase or decrease persuasion by enhancing message-relevant cognitive responses. *Journal of Personality and Social Psychology*, 37, 1915-1926.
- Prochaska, J. O., DiClemente, C. C., Norcross, J. C. (1992). In search of how people change. *American Psychologist*, 47, 1102-1114.
- Quine L, Rutter DR, & Arnold L. (1998). Predicting and understanding safety helmet use among schoolboy cyclists: a comparison of the theory of planned behavior and the health belief model. *Psychology of Health* 13:251-69.
- Rippetoe, P. A. and R. W. Rogers (1987). Effects of components of protection-motivation theory on adaptive and maladaptive coping with a health threat. *Journal of Personality and Social Psychology*, 52: 596-604.
- Rogers, R.W. (1975). A Protection Motivation Theory of fear appeals and attitude change. *Journal of Psychology*, 91, 93-114.
- Rosenstock, I.M. (1974). Historical origins of the health belief model. *Health Education Monographs*, 2, 328-335.
- Rothman, A. J. & Salovey, P. (1997). Shaping perceptions to motivate healthy behavior: The role of message framing. *Psychological Bulletin*, 121, 3-19.
- Schifter, D. E., & Ajzen, I. (1985). Intention, perceived control, and weight loss: An application of the theory of planned behavior. *Journal of Personality & Social Psychology*, 49(3), 843-851.
- Schwarzer Ralf, and Renner, Britta. (2000). Social-Cognitive Predictors of Health Behavior: Action Self-Efficacy and Coping Self-Efficacy. *Health Psychology*, Vol. 19, No. 5, p 487-495
- Seydel, E., Taal, E., & Wiegman, O. (1990). Risk-appraisal, outcome and self-efficacy expectancies: Cognitive factors in preventive behavior related to cancer. *Psychology and Health*, 4, 99-109.
- Sheeran P, & Taylor S. (1999). Predicting intentions to use condoms: a meta-analysis and comparison of the theories of reasoned action and planned behavior. *Journal of Applied Social Psychology*, 29:1624-75
- Sparks, P., & Shepherd, R. 1992. Self-identity and the theory of planned behavior: Assessing the role of identification with "green consumerism." *Social Psychology Quarterly*, 55: 388-399.
- Sturges J.W., & Rogers, R. W. (1996). Preventive Health Psychology From a Developmental Perspective: An Extension of Protection Motivation Theory, *Health Psychology*, Vol. 15, No. 3, p 158-166.

- Sutinen J. G., & Kuperan, K. (1999). A socio-economic theory of regulatory compliance. *International Journal of Social Economics*, Vol 26, Issues 1/2/3, pg. 174.
- Sutton S. (1998). Predicting and explaining intentions and behavior: How well are we doing? *Journal of Applied Social Psychology* 28:1317-38
- Taylor, Natalie. (2001). Understanding taxpayer attitudes through understanding taxpayer identities. Working Paper No. 14. Centre for Tax System Integrity, Research School of Social Sciences, Australian National University.
- Trafimow, D., & Fishbein, M. (1994). The importance of risk in determining the extent to which attitudes affect intentions to wear seat belts. *Journal of Applied Social Psychology*, 24: 1-11.
- Tversky, A. & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, 211, 453-458.
- Vanlandingham, M. J., Suprasert, S., Grandjean, N., Sittitrai, W. (1995). Two views of risky sexual practices among northern Thai males: The health belief model and the theory of reasoned action. *Journal of Health and Social Behavior*, 36, 195-212.
- Weinstein, N.D. (1988). The precaution adoption process. *Health psychology*, 7, 355-386.
- Weinstein, Neil, D. (1993). Testing Four Competing Theories of Health-Protective Behavior. *Health Psychology*, Vol. 12, No. 4, p 324-333.
- Weinstein N. D., & Sandman, P. M. (1992). A Model of the Precaution Adoption Process: Evidence From Home Radon Testing. *Health Psychology*, 11(3), 170-180
- Witte, K. (1992). Putting the fear back into fear appeals: The extended parallel process model. *Communication Monographs*, 59, 329-349.
- Witte, K., Stokols, D., Ituarte, P., & Schneider, M. (1993). Testing the health belief model in a field study to promote bicycle safety helmets. *Communication Research*, 20, 564-586.
- Wood, Robert, & Bandura, Albert,. (1989). Impact of Conceptions of Ability on Self-Regulatory Mechanisms and Complex Decision Making. *Journal of Personality and Social Psychology*, Vol. 56, No. 3, p 407-415.
- Wurtele, S.K., and Maddux, J.E. (1987). Relative contributions of protection motivation theory components in predicting exercise intentions and behavior. *Health Psychology*. 1987;6(5):453-66.