

# Protection Motivation Theory

Protection Motivation Theory (PMT) is a theory explaining the impact of persuasive communication on protective behaviour with an emphasis on cognitive mechanisms mediating fear appeals and behaviour change.

By Davit Marikyan (Business School, University of Bristol, UK) & Savvas Papagiannidis (Business School, Newcastle University, UK)

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## Theory Factsheet

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**Proposed By:** Rogers, 1975

**Parent Theory:** Cost-benefit paradigm, expectancy-value theory

**Related Theories:** Drive-reduction Model, Theory of Reasoned Action, Health Belief Model, Subjective Expected Utility Theory, Self-efficacy Theory, Conceptualisation of Achievement Motivation, Decision Making Theory, Purposive Behaviourism, Fear Appeals Model

**Discipline:** Psychology

**Unit of Analysis:** Individual

**Level:** Micro-level

**Type:** Theory for Explaining and Predicting

**Operationalised:** Qualitatively / Quantitatively

## Introduction

Protection Motivation Theory (PMT) was introduced by (Rogers, 1975) and further revised in 1983 (Rogers, 1983) to explain the impact of persuasive communication on behaviour, with an emphasis on cognitive mechanisms underpinning the rationale to follow or not to follow a recommended behaviour. The theory was originally conceptualised for the utilisation in the healthcare context (Conner & Norman, 2015). There were several practical and theoretical premises underpinning the development of the theory (Conner & Norman, 2015; Prentice-Dunn & Rogers, 1986). In terms of practical importance, PMT was one of the first theories focusing on the psychological conditions explaining the tendency of people to protect themselves. The theory attempted to distinguish the factors of health-compromising and health-promoting behaviours (Prentice-Dunn & Rogers, 1986; Floyd, Prentice-Dunn & Rogers, 2000). For example, despite the logic of avoiding threat and danger when recommended, individuals may still choose to engage in maladaptive behaviour. Protective behaviours, such as using seatbelts, regular physical examinations, a healthy lifestyle, refraining from mobile phone use while driving, avoiding driving under the influence and using helmets while cycling

could be taken to prevent injuries. However, people often do not adhere to preventive measures (Floyd, Prentice-Dunn & Rogers, 2000; Taylor, 2017; Rogers & Prentice-Dunn, 1997).

From the theoretical perspective, the introduction of PMT aimed to advance the literature explaining health-protective behaviours, which had largely relied upon the Theory of Reasoned Action, Subjective Expected Utility Theory and the Health Belief Model (Floyd, Prentice-Dunn & Rogers, 2000). The Theory of Reasoned Action postulates that behaviour is predicted by behavioural intention, which is formed as a result of pre-existing attitudes to behaviour and social norms surrounding the behaviour (Barrett, 1980). Subjective Expected Utility Theory, developed by (Savage, 1972), presents an individual's decision as a response to an economic proposition, whereby its attractiveness is based on the subjective evaluation of the personal utility of the behaviour and the probability of the utility being realised. The likelihood of the decision is higher when the perception of the utility functions of behaviour is stronger and the probability of the outcome is higher (Savage, 1972). The Health Belief Model suggests that health behaviour is influenced by four types of cognitions: perceived susceptibility (perception the risk of health threat), perceived severity (the strength of the threat), the perceived benefits and barriers (negative consequences) of the protective/recommended behaviour (Prentice-Dunn & Rogers, 1986; Rosenstock, 1974). All of the theories are rooted in a cost-benefit paradigm, which states that before adopting the recommended behaviour, individuals conduct a cost-benefit analysis. The motivation to follow an adaptive behaviour is fuelled by perceived threats and individuals' appeal for avoiding the negative consequences of not engaging in the behaviour (Weinstein, 1993).

While many core constructs across the Theory of Reasoned Action, the Health Belief Model, Subjective Expected Utility Theory and PMT are similar, the introduction of PMT aimed to address a few gaps in the literature on health protection motivation that had been limiting the understanding of and the relationships between the psychological and cognitive drivers of protective behaviour. First, the primary limitation of the Theory of Reasoned Action and Subjective Expected Utility Theory is that the models do not account for the factor associated with risky and non-risky behaviours, namely response efficacy (Floyd, Prentice-Dunn & Rogers, 2000). Second, although the Health Belief Model is considered sufficiently powerful when it comes to predicting behaviour due to its intuitive and straightforward organisation of cognitive factors, it does not fully address the complexity of the drivers of adaptive behaviour (Prentice-Dunn & Rogers, 1986). Specifically, the theory proposes a list of factors that motivate individuals. However, it does not explain whether the factors are part of threat or coping appraisals. In addition, the theory does not explain the relative importance of threat and coping appraisals when it comes to decision-making processes. For example, when it comes to smoking, the recommended behaviour is to quit it. However, to comply with the recommendation individuals should think that they are vulnerable to the threat and the threat is severe enough (e.g. as a result of smoking, they might get lung cancer). That means that individuals should score higher on threat appraisals than on coping appraisals. In addition, individuals should believe that they are able to quit smoking and can overcome the associated costs (e.g. nicotine withdrawal process) (Floyd, Prentice-Dunn & Rogers, 2000). Therefore, PMT went beyond stating that the perceptions of threat severity, vulnerability, response cost, response efficacy and self-efficacy drive behaviour change, but it captured the complexity of motivation by explaining the effects of two cognitive appraisal processes (coping appraisals and threat appraisals). Specifically, based on PMT, individuals need to assess the threat appraisal dimension (perceive that they are vulnerable to the threat and it is severe enough) and coping appraisal (acknowledge the cost of carrying out the suggested action to comply with the recommended behaviour) separately (Floyd, Prentice-Dunn & Rogers, 2000; Rogers & Prentice-Dunn, 1997; Rogers, 1975). Third, prior research on fear-induced behaviour provided mixed findings about the motivational role of fear arousal and the likelihood of compliance with recommended behaviour (Janis, 1967; Sutton, 1982). Specifically, (Janis, 1967) argued that fear does not necessarily promote adaptive behaviour, as fear may also lead to a thorough assessment of the recommendation, potentially inhibiting motivation if fear arousal achieved a certain threshold.

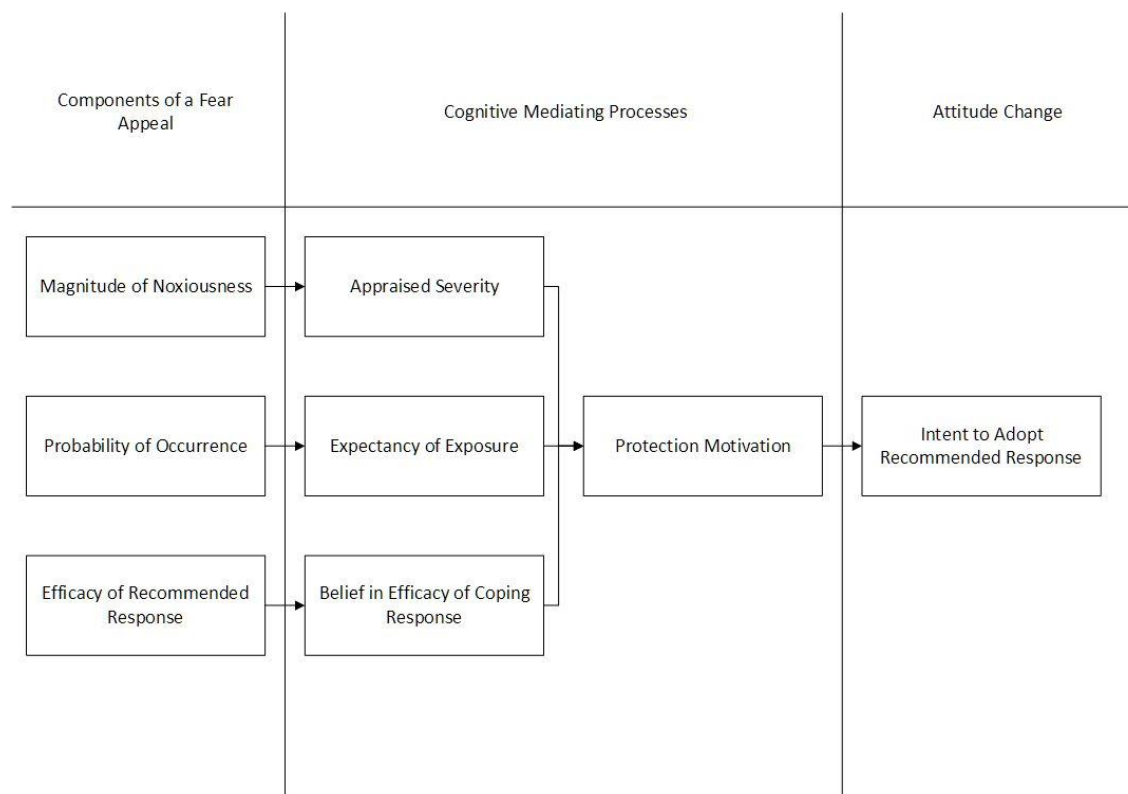
Further other empirical work, however, did not find sufficient support for the proposed effect of fear (Sutton, 1982). Hence, the development of PMT was required to provide conceptual clarity to the research on fear appeal and motivation, by identifying the key variables related to fear appeals and cognitive factors.

## **Theory**

PMT is based on Expectancy-Value Theory (Rogers, 1975). Expectancy Value Theory postulates that expectancy and value are the two factors determining the likelihood of a person engaging in behaviour (Vroom, 1964). Expectancy concerns the probability that behaviour will result in the desired outcome, while value refers to the utility that an individual assigns to that outcome. It is believed that motivation is the result of the multiplicative impact of value and expectancy. That means that strong motivation is possible when people score high on both constructs. If either of the factors is equal to zero, motivation falls to zero too (Vroom, 1964). While PMT does not incorporate expectancy and value factors in the model, the theory postulates that people behave in a certain manner due to the expectancy of the consequences of their actions, which have a certain value (Floyd, Prentice-Dunn & Rogers, 2000; Prentice-Dunn & Rogers, 1986; Rogers, 1975).

Protection Motivation Theory considers the motivation to adopt the recommended behaviour as an attitudinal state (attitude change) predicted by cognitive processes mediating the effect of fear appeals (Rogers, 1975) (Figure 1). In line with expectancy-value theories (Atkinson, 1964; Edwards, 1954; Rogers, 1975) broke down fear appeals into three crucial stimuli, namely magnitude of the noxiousness of an event, the probability of event occurrence, and efficacy of recommended response reducing the stimuli of the noxious event. For example, studies in health psychology examine fear stimuli, such as the strength and the probability of cardiac attacks, and the efficacy of a healthy diet and lifestyle in reducing the likelihood of cardiac diseases (Plotnikoff & Higginbotham, 1998). Fear appeals could present communication about one and the combination of two or three of the mentioned components that may trigger cognitive processes. These cognitive processes represent appraisals of the communicated information about the noxiousness of a negative event, its probability of occurrence and efficacy of response. The cognitive processes reflect the appraisal of the severity of a threatening event, the expectancy of exposure to the threat and the efficacy of a coping response (Rogers, 1975). Appraisal of the severity of the threat concerns the evaluation of the degree to which the event can cause harm and damage. Expectancy of exposure refers to the assessment of the extent to which a person is susceptible to the threatening event, while the efficacy of a coping response is a belief that the adaptive behaviour would be effective in mitigating the threat (Floyd, Prentice-Dunn & Rogers, 2000). Each appraisal process corresponds and is roughly proportional to the fear appeal component, e.g. the strength of threat severity appraisal is similar to the strength of the magnitude of the noxious event (Rogers, 1975). For the cognitive processes to lead to protective behaviour, their effect should be multiplicative, meaning that all beliefs should be sufficiently salient to lead to adaptive behaviour – i.e. belief that the threat is serious and individuals are vulnerable to it, as well as the belief that the suggested action is feasible to carry out and will be effective against the imminent threat (Rogers, 1975). This assumption is in line with the principle of Expectancy Value Theory (Vroom, 1964), which means that a zero score on any of the cognitive processes would reduce motivation to zero.

**Figure 1: Protection Motivation Theory**



By developing the theory of protection motivation, (Rogers, 1975) aimed to follow the tradition of prior psychological theories adopting the expectancy-value paradigm to explain attitudinal structures, behaviour and persuasive communication. At the same time, the proposed theory enabled Rogers to link small-scale theories into a higher-order model of the relationship between environmental stimuli inducing fear, cognitive processes, and motivation. That helped reach a more comprehensive explanation of the psychological foundation of protection motivation (Rogers, 1975). In addition, the development of the theory was the first attempt to address conflicting findings in the literature about the impact of fear appeals on attitude change and consequent behaviour (Janis, 1967; Sutton, 1982). Those inconsistencies were rooted in the hesitancy of prior studies to conceptualise and differentiate the components of fear appeal (Floyd, Prentice-Dunn & Rogers, 2000; Rogers, 1975). PMT, in contrast, brought together the crucial factors of fear appeal, associated with cognitive variables mediating the impact of emotion on behaviour/attitude change (Rogers, 1975). A comprehensive yet intuitive framework explaining complex cognitive processes underpinning protective motivation has led to the adoption of the theory beyond the original health context. The wide application of PMT across different domains (Floyd, Prentice-Dunn & Rogers, 2000; Ritland & Rodriguez, 2014; Marikyan et al., 2022) and a meta-analysis of studies employing PMT demonstrate that the theory is robust in terms of explaining the behaviour of individuals facing threats (Floyd, Prentice-Dunn & Rogers, 2000).

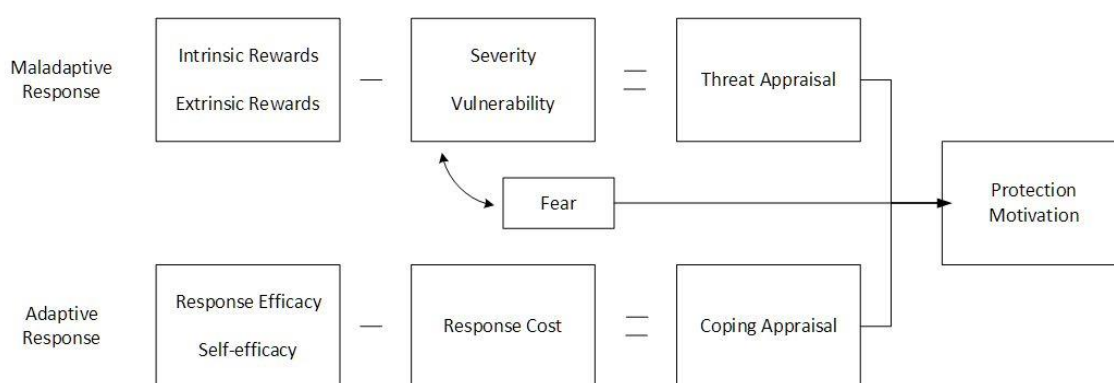
## Theory Updates/Extensions

### Revised PMT

The cognitive mediating processes postulated by the original PMT model were shown to be an effective source to stimulate protection motivation (Rogers & Prentice-Dunn, 1997). However, further inquiries into the factors contributing to attitude/behaviour change following the encounter

with the imminent threat led to the revision of the theory by (Rogers, 1983). The updated conceptual framework included self-efficacy (i.e. an individual's belief as to whether they are capable of complying with the recommended behaviour), the perception of the rewards of counter-protective behaviour and the perception of the costs of protective behaviour, which made the theory more comprehensive (Figure 2) (Rogers, 1983; Maddux & Rogers, 1983). The incorporation of rewards and costs reflected the strong focus on the rationality of decision-making. The reason behind the inclusion of self-efficacy is that the construct had been found to be strongly associated with behaviour change (Bandura et al., 1980; Conditte & Lichtenstein, 1981; Beck & Ajzen, 1991). Self-efficacy originated from the Self-efficacy Theory, which postulates that individuals are likely to change behaviour when their self-belief or efficacy is strong (Maddux & Rogers, 1983; Bandura, 1977).

**Figure 2: Cognitive Mediating Process of Protection Motivation Theory**



As a result of the operationalisation of the theory, the PMT full nomology is comprised of seven variables, which schematically could be grouped into emotion, coping appraisal and threat appraisal factors (Figure3) (Boss et al., 2015; Floyd, Prentice-Dunn & Rogers, 2000; Rogers & Prentice-Dunn, 1997). Response efficacy, self-efficacy and response cost are coping appraisal constructs. They concern the evaluation of the coping resources available to the individual facing a threat. Threat severity, threat vulnerability and maladaptive rewards relate to threat appraisal factors. Fear mediates the paths between threat severity, threat vulnerability and protection motivation (Floyd, Prentice-Dunn & Rogers, 2000; Rogers & Prentice-Dunn, 1997). However, PMT core nomology (a simplified version of PMT) found wide application in the literature across many scientific domains, which includes five factors and excludes maladaptive rewards and fear (Figure 4) (Boss et al., 2015). According to this nomology, adaptive behaviour is the outcome of the positive function of response-efficacy, self-efficacy, threat vulnerability and threat severity, and the negative function of response cost (Rogers, 1983). The operationalisation of the model has led to its wide adoption for two reasons. On the one hand, the inclusion of self-efficacy improved the predictive power of the model, as the construct was confirmed to be the strongest predictor of behavioural intention (Maddux & Rogers, 1983). On the other hand, the theory has become methodologically simpler. In contrast to the original model, which suggested that the cognitive factors impact motivation in a multiplicative fashion (Rogers, 1975), the revised version enables researchers to test the effect of each variable (Rogers, 1983; Conner & Norman, 2015).

**Figure 3: Full Nomology of Protection Motivation Theory**

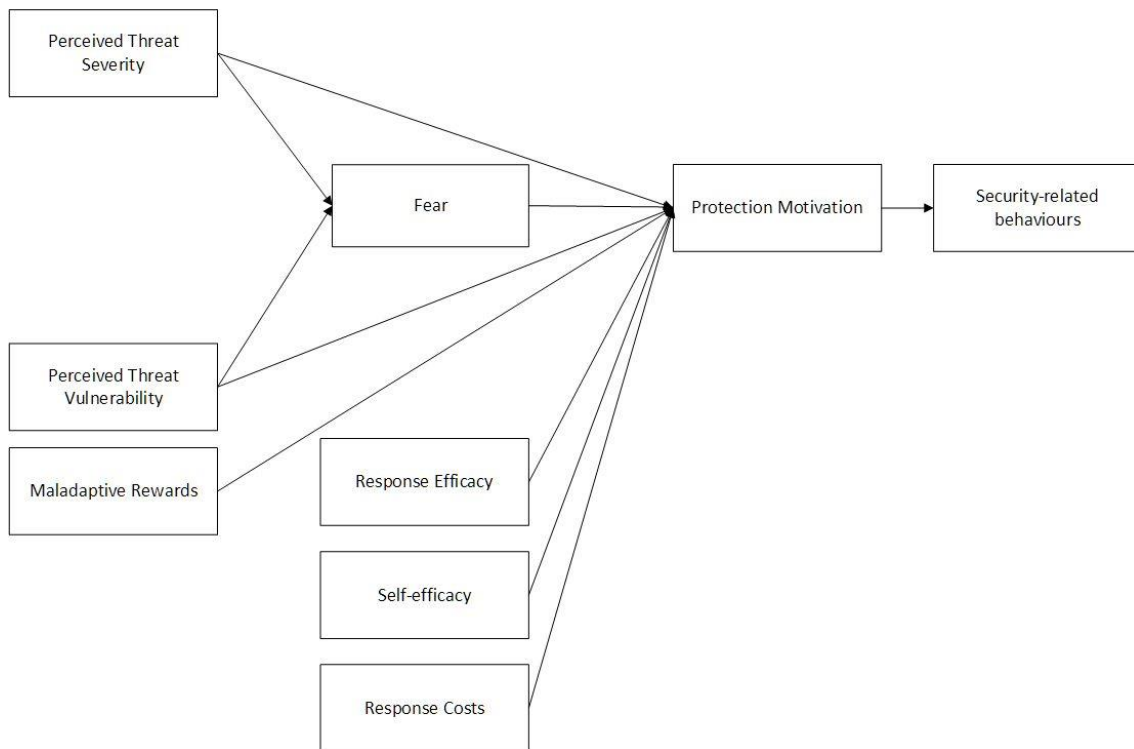
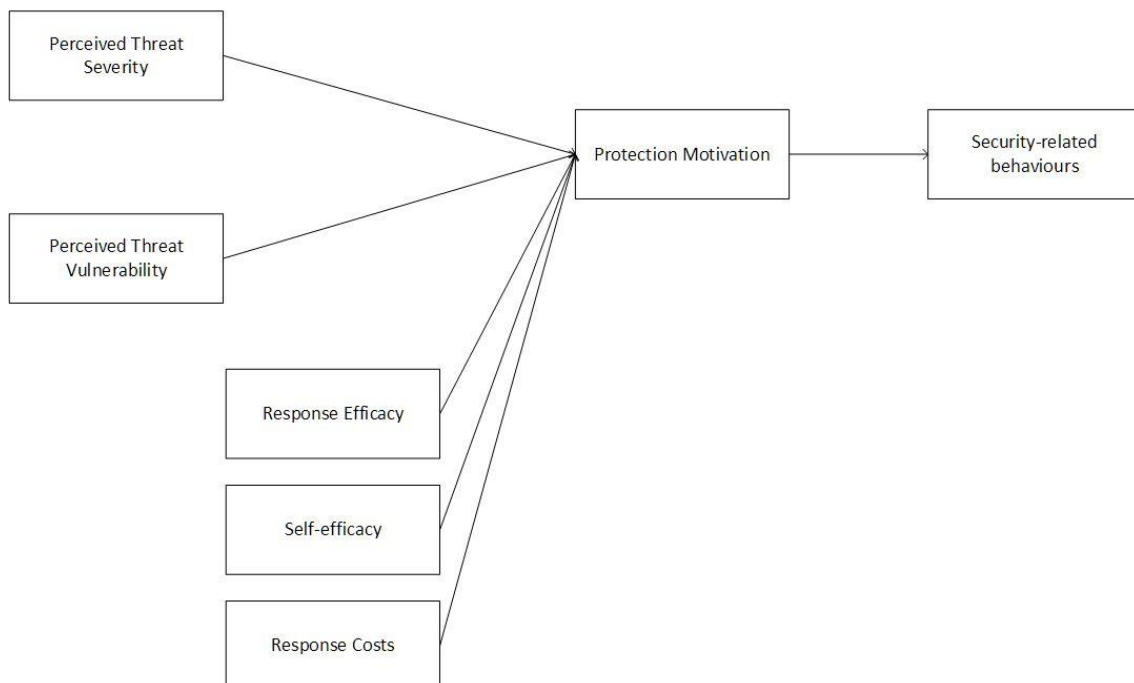


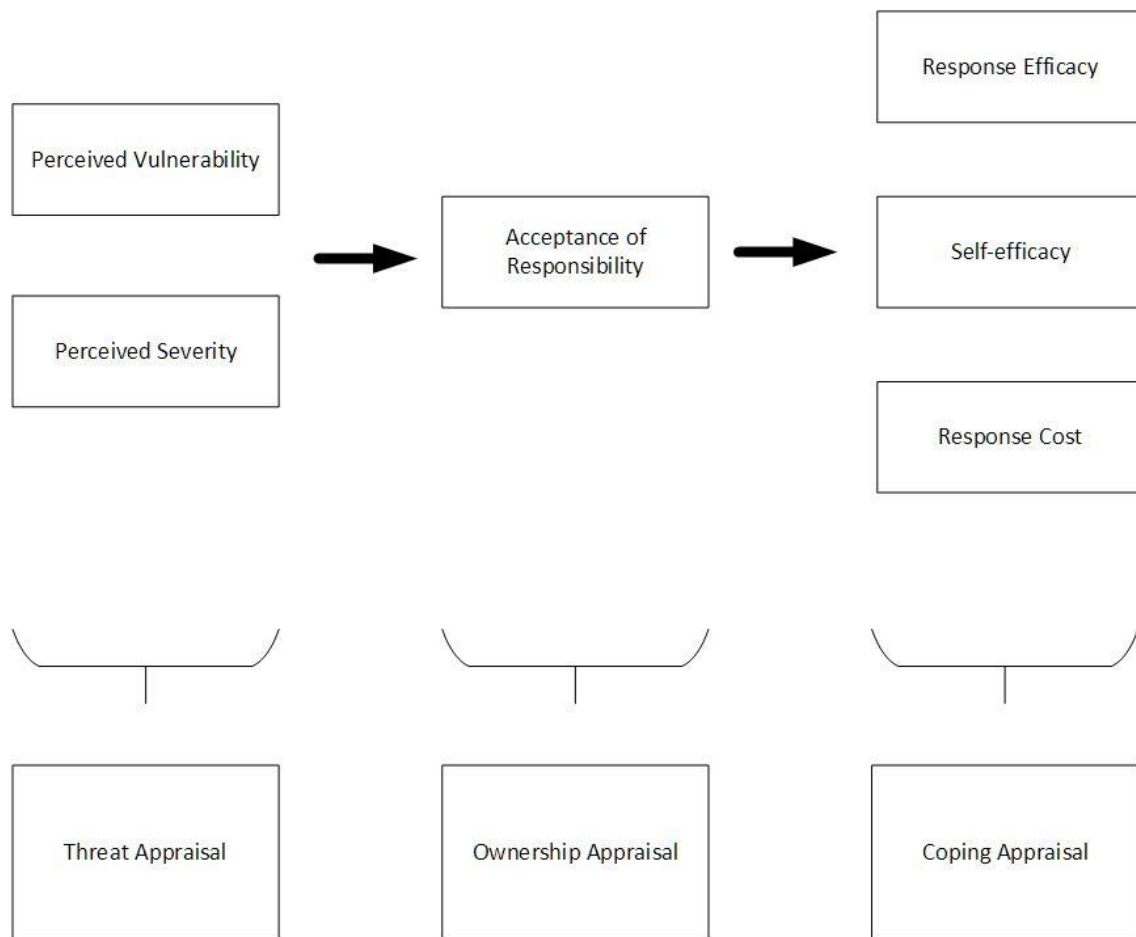
Figure 4: Core Nomology of Protection Motivation Theory



**Augmented Protection Motivation Theory**

Augmented Protection Motivation Theory was developed in order to focus on behaviour that does not reflect the rules of rational decision-making (Oakley et al., 2020) (Figure 5). People might demonstrate irrational behaviour in the face of threat. For instance, knowing the likelihood of flooding threat, individuals might not take actions to avoid being flooded or minimise the negative consequences (e.g. designing floodproof houses) (Oakley et al., 2020). In an attempt to expand the theory beyond the boundaries of rationality, the authors added a third cognitive dimension (in addition to coping and threat appraisals) about ownership appraisal. Ownership appraisal refers to the acceptance of responsibility for carrying out protective behaviour. The authors argued that the evaluation of threat severity and vulnerability triggers the assessment of the degree to which the responsibility for adaptive behaviour needs to be laid on oneself. This cognitive phase can also be affected by individuals' emotions and social norms. The ownership appraisal process, in turn, leads to the evaluation of coping resources (Oakley et al., 2020). Given the novelty of Augmented Protection Motivation Theory, the applicability of the theory in different context is yet to be validated.

**Figure 5: Augmented Protection Motivation Theory**



## Applications

Due to the robustness of PMT, it has been used in different disciplines, such as psychology / health psychology (Plotnikoff & Higginbotham, 1998; Wurtele & Maddux, 1987), sport science (Plotnikoff &

Trinh, 2010), tourism (Wang et al., 2019), environmental science (Cismaru et al., 2011; Chen, 2020; McCaughey et al., 2017) and marketing (inc. advertisements and consumer behaviour) (Pechmann et al., 2003; Tunner, Day & Crask, 1989; Papagiannidis et al., 2022). To a great degree, such applications demonstrated the predictive strength of the threat appraisal and coping appraisal variables. For example, a meta-analytic study of research on health behaviour confirmed that over the decades, the theory was a powerful theoretical model explaining protection motivation (Milne, Sheeran & Orbell, 2000). PMT was used to understand conditions that motivate cardiac patients to keep up with a healthy diet and exercise regularly (Plotnikoff & Higginbotham, 1998). It was found that perceived vulnerability and self-efficacy were the strongest determinants of a behaviour shift towards a healthy lifestyle (Plotnikoff & Higginbotham, 1998). In tourism, the protection motivation model was employed to investigate tourists' self-protective behaviour while travelling. It was found that both coping and threat appraisals increase individuals' motivation to take precautionary measures to prevent health risks (Wang et al., 2019). In the environment-related context, the core cognitive constructs of the theory were significant when it came to intention to embark on climate-change mitigation behaviour (Chen, 2020). However, following evidence of the research on the front of pro-environmental behaviour, the protection motivation framework was extended with the moral obligation factor (Chen, 2020). Moral obligation refers to the perception of the degree to which a performed behaviour is morally acceptable (Conner & Armitage, 1998). As the name of the construct suggests, moral obligations touch upon the ethical aspect of actions, which is crucial when it comes to environmental preservation (Chen, 2020). Perceived moral obligation defines the feeling of responsibility over one's own action when facing an ethical choice (Beck & Ajzen, 1991). The empirical testing of the theory showed that moral obligation has a positive relationship with the intention to engage in adaptive behaviour. Moreover, the model explained 73.84% of the variance in the dependent variable, which is higher than the exploratory power of the original PMT model (Chen, 2020). As far as the marketing context was concerned, the manipulation of the core constructs with fear appeals helped find that the type of communication, gender and other potential variables may account for the variance in the effect sizes of protection motivation determinants (Tunner, Day & Crask, 1989).

The advancement of technology and widespread digitalisation made the information communication technologies ubiquitous in personal and business life (Venkatesh & Bala, 2008; Marikyan, Papagiannidis & Alamanos, 2019; Marikyan, Papagiannidis & Alamanos, 2021; Marikyan et al., 2022; Papagiannidis & Marikyan, 2020; Tajudeen et al., 2022). That triggered the wide employment of the protection motivation theory in the information systems management field over the last two decades. Considering the debates about the threats that technology could pose for users (e.g. pretexting, phishing, targeted malware, cyberattacks) and organisations (Verkijika, 2018; Ifinedo, 2012; Thompson, McGill & Wang, 2017), the theory was useful in understanding the factors that make individuals avoid technology-related threats (Ifinedo, 2012; Crossler, 2010). The protective and preventive measures could include compliance with information system policies in organisational settings (Ifinedo, 2012) and the use of secure passwords, regular back up of data and installation of software in private settings (Crossler, 2010; Chenoweth, Minch & Gattiker, 2009). However, the significance of the PMT constructs was not consistent across different security applications (Ifinedo, 2012; Chenoweth, Minch & Gattiker, 2009; Marikyan et al., 2022). When examining the adoption of anti-spyware software, all constructs but self-efficacy were found to predict behavioural intention (Chenoweth, Minch & Gattiker, 2009). When studying individuals' intention to back up data, only self-efficacy and response efficacy had direct impacts (Crossler, 2010). Similarly, when it came to secure online behaviour, perceived threat severity and perceived threat vulnerability did not have any correlations with a behavioural intention (Tsai et al., 2016). The perceived threat severity factor was not significant when exploring the intention to adopt blockchain technology either (Marikyan et al., 2022). The plausible interpretation of those inconsistent findings could be the variability of individuals' perceptions of threatening events and their consequences depending on the context (Ifinedo, 2012; Marikyan et al., 2022).



In an attempt to increase the explanatory power of the model when it came to information system utilisation, scholars came up with two updates of PMT (Verkijika, 2018; Lee, 2011). The first contextualisation incorporates regret as an emotional state that mediates threat appraisal and security behaviour (Verkijika, 2018). Regret was deemed necessary in relation to technology use, which is characterised by salient privacy concerns. In cases of privacy compliance, anticipated regret was confirmed to be a significant predictor (Sommestad, Karlzén & Hallberg, 2015). Path analysis showed that anticipated regret had a direct impact on security intention and behaviour. The model expanded the understanding of security compliance by establishing the role of emotions in strengthening motivation. While prior research employing the five-factor PMT model found that cognitive processes account for 11% of the variance in intentions (Thompson, McGill & Wang, 2017), the addition of anticipated regret improved the variance in the outcome variable up to 33% (Verkijika, 2018). The second modification of the theory incorporates moral obligation, social influence and control variables (Lee, 2011). The theory adaptation in relation to security-compliant behaviour was motivated by three research objectives. First, the study aimed to extend PMT by conceptualising a direct impact of coping appraisals on the recommended behaviour. That objective was justified by prior studies using well-established theories (e.g. the Theory of Planned Behaviour, Technology Acceptance Model) and confirming the direct impact of perceptions on behaviour (Beck & Ajzen, 1991; Venkatesh et al., 2003). Second, by incorporating control variables (e.g. teaching load, academic rank, class size), the author aimed to demonstrate the variance in the motivation depending on context-specific factors. Third, testing the direct effect of moral obligation and social influence on security intentions made it possible to understand the predictive power of the judgement about the responsibility over security behaviour and the social pressure of peers, which had largely been ignored in the IS literature. The extended PMT model explained over 60% of the variance in adaptive behaviour (adoption of anti-plagiarism software). The results demonstrated that out of all coping appraisal factors, only response efficacy affects adoption. Intention is predicted by moral obligations, but not social influence. Also, the model shows the importance of contextual factors. For instance, it was found that the higher the rank of staff, the less likely they are to adopt anti-plagiarism software. Also, it was reported that women are less inclined to adopt anti-plagiarism software (Lee, 2011). Stemming from the novel findings of the significant role of control variables, this contextualisation of PMT brought a number of useful practical implications.

## **Limitations**

Although PMT is a rigorous framework to understand individuals' intention to comply with adaptive behaviour, it has been noted by the author of the theory and other researchers that it does not provide an exhaustive list of all environmental factors, cognitive processes and moderators that might shape motivation (Rogers, 1975; Weinstein, 1993). The limitations of the theory were partly addressed in the revision of the framework in 1983 by Rogers, Cacioppo and Petty, whereby cognitive and individual variables, namely response cost and self-efficacy, were added to the model. The addition of those factors was a significant move toward expanding the exploratory power of the theory as evidenced by its wide testing in diverse disciplines (Boss et al., 2015; Verkijika, 2018; Lee, 2011). Later, PMT was also extended to account for psychological pre-conditions differentiating individuals' responses to adaptive behaviour by adding anticipated regret as a predictor of motivation (Verkijika, 2018).

A few other critiques have largely been unresolved. In particular, from the decision-making perspective, PMT follows the logic of rational behaviour, which is inherent to the cost-benefit paradigm (Wu, 2020). The predictive power of the theory holds true when in the face of imminent threats, respondents have the ability to assess threats and coping mechanisms rationally (Sturges & Rogers, 1996). However, individuals are not always rational in their decision-making. They might not match threat and coping appraisals when deciding to comply with or ignore recommendations about

protective behaviour (Floyd, Prentice-Dunn & Rogers, 2000). The principle of the rationality of choice limits the applicability of the theory to situations and some subject groups, such as children, who might not have the ability to conduct a rigorous cost-benefit analysis of choices (Sturges & Rogers, 1996).

PMT assumes that the cognitive processes are invariant across people with different personality traits and characteristics. For example, threat vulnerability is a subjective assessment, as people may attach different meanings to it depending on their own threat sensitivity threshold (Floyd, Prentice-Dunn & Rogers, 2000). In addition, dispositional factors (i.e. to what degree the person is situationally or psychologically predisposed to mitigating the threat), such as anxiety and defensive style, were found to impact the appraisal of fear appeals, although they were not incorporated into the model (Rogers, 1975). The importance of individual socio-demographic characteristics in explaining variance in motivation was confirmed when testing the moderating role of gender and age. The effects of threat appraisal factors were stronger for women and elderly people, while the effects of coping factors were stronger for men and younger people (Guo et al., 2015). Despite a few attempts to extend PMT with individual factors (Guo et al., 2015; Lee, 2011), the role of personality and psychological characteristics has stayed mostly unexplained.

There have been concerns about the meaning and the operationalisation of the response cost variable. The critique refers to the wider stream of health-protective behaviours and PMT in particular. Specifically, it is not clear whether the cost of carrying out adaptive behaviour (response cost) should be disintegrated from the expected loss of rewards (intrinsic and extrinsic) (Weinstein, 1993). Such a debate arose due to the theoretical ambiguity of whether response cost relates to the loss associated with switching behaviour or whether it refers to the potential loss (e.g. financial investment, mental effort) associated with carrying out the recommended behaviour.

In addition, it has been argued that PMT fails to explain individuals' intention to comply with suggested behaviour in specific cases. It was concluded that the theory should be extended by context-specific factors (Verkijika, 2018; Ifinedo, 2012; Thompson, McGill & Wang, 2017), especially against the backdrop of the findings that the inclusion of more than one factor in the model increases its explanatory power up to 70% (Verkijika, 2018). To respond to this critique, a few modifications have been applied to the model. For example, to understand pro-environmental behaviour, PMT was extended with the moral obligation construct, which enabled researchers to widen the application of the theory to behaviours beyond health protection (Chen, 2020). To explore the inhibitors of behaviour change, (Pechmann et al., 2003) tested and confirmed the role of social disapproval risks in predicting motivation. Although time preference was tested in prior research as a predictor of behaviour in emergency situations, such as flooding (Botzen et al., 2019), scholars have not yet investigated other temporal factors that might affect the perception of the persuasiveness of the advice of protective behaviour. Those factors include the duration of the fear stimulus and the time period between the exposure to information and the actual threatening event (Rogers, 1975).

## Concepts

**Response Efficacy** (Independent): The belief that the adaptive response will work, that taking the protective action will be effective in protecting the self or others. (Floyd, Prentice-Dunn & Rogers, 2000)

**Self-efficacy** (Independent): The perceived ability of the person to actually carry out the adaptive response. (Floyd, Prentice-Dunn & Rogers, 2000)

**Response Cost (Independent):** The costs (e.g. monetary, personal, time, effort) associated with taking the adaptive coping response (Floyd, Prentice-Dunn & Rogers, 2000)

**Fear (Independent):** A negatively valenced emotion representing a response that arises from recognizing danger. This response may include any combination of apprehension, fright, arousal, concern, worry, discomfort, or a general negative mood, and it manifests itself emotionally, cognitively, and physically (Boss et al., 2015)

**Perceived Threat Severity (Independent):** How serious the individual believes that the threat would be to him- or herself (Milne, Sheeran & Orbell, 2000)

**Perceived Threat Vulnerability (Independent):** How personally susceptible an individual feels to the communicated threat (Milne, Sheeran & Orbell, 2000)

**Maladaptive Rewards (Independent):** The general rewards (intrinsic and extrinsic) of not protecting oneself, contrary to the fear appeal. (Boss et al., 2015)

**Adaptive Behaviour (Dependent):** A purposeful choice of a danger-control response in response to a fear appeal and choosing a behaviour that protects against the danger raised in the fear appeal (Boss et al., 2015)

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