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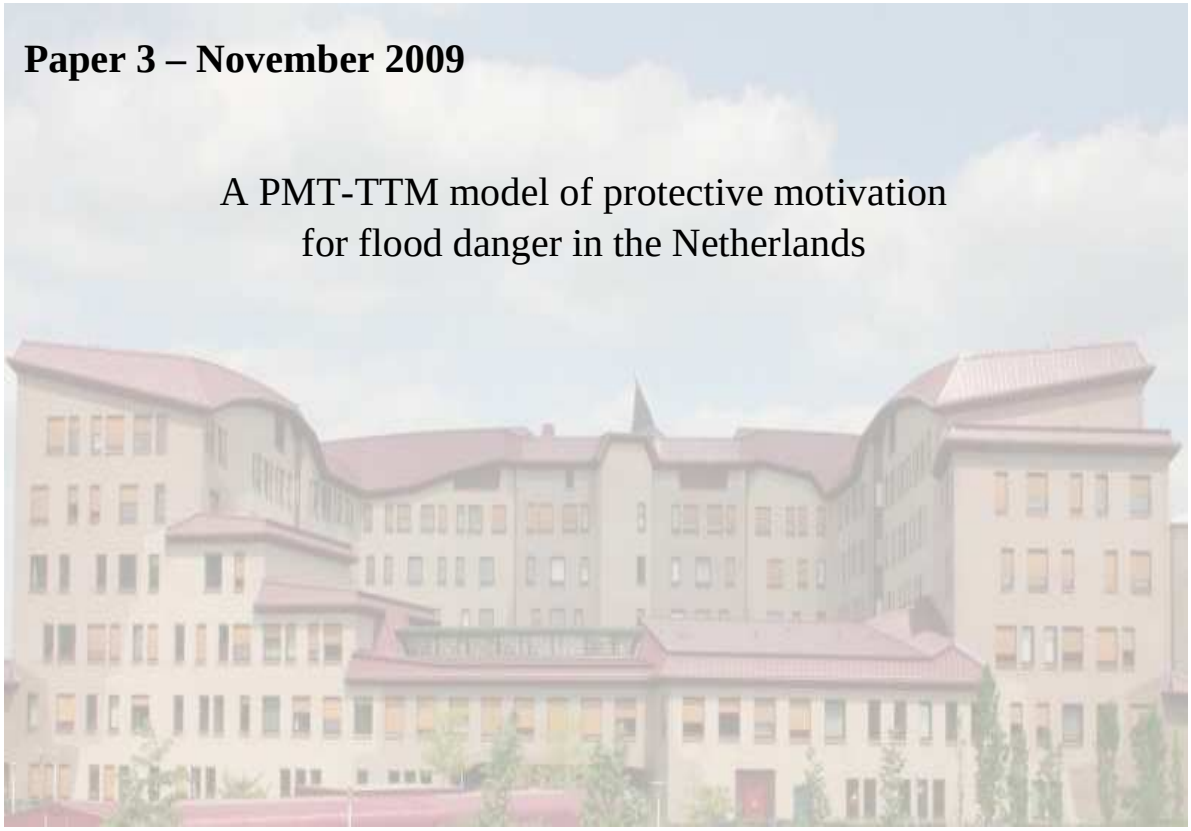

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ITC
International Institute for Geo-Information Science and Earth Observation
P.O. Box 6 7500 AA Enschede The Netherlands Phone:+31 (0)53 487 4444 Fax: +31 (0)53 487 4400

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A PMT-TTM model of protective motivation for flood danger in the Netherlands

M. Bočkarjova (bockarjova@itc.nl)

VU University Amsterdam, Department of Spatial Economics, de Boelelaan 1105, 1081 HV Amsterdam, The Netherlands, and
ITC - International Institute for Geo-Information Science and Earth Observation, Department of Urban and Regional Planning and Geo-Information Management, PO Box 6, 7500 AA Enschede, The Netherlands.

A. van der Veen (veen@itc.nl)

ITC - International Institute for Geo-Information Science and Earth Observation, Department of Urban and Regional Planning and Geo-Information Management, PO Box 6, 7500 AA Enschede, The Netherlands, and
University of Twente, Faculty of Civil Engineering, PO Box 217, 7500 AE Enschede, The Netherlands

P.A.T.M. Geurts (p.a.t.m.geurts@utwente.nl)

University of Twente, School of Management and Governance, PO Box 217, 7500 AE Enschede, The Netherlands

1 INTRODUCTION

The aim of this paper is to investigate the issue of cognitive perception of flood risk and the readiness of individuals to undertake protective action in the Netherlands. This research is motivated by the emerging change in thinking from flood probability to flood risk in the Netherlands which will have important implications for flood management policy in the country. In the face of this change, risk governance will be affected at various levels, and will interlude the administrative, social and economic perspectives. The question that governs current debate as in academic as in policy-making circles is: Should people be assumed responsible for their undergoing flood risk, or should this responsibility lie with the government?

The focal point of our discussion in this context is the designated shift of responsibility on flood protection from belonging exclusively to the public domain to the situation when the responsibility and risks are *shared* between public and private actors. Essentially, in order to ensure this transition, there is a need 1) to explore the current or initial state of readiness of the public to undertake protective action, and 2) to create a broad platform of support among the general public for the new mode of dealing with floods in the Netherlands. This means that some questions have to be answered. First, how can public awareness of flood risk be raised? And, second, more specifically, how to communicate flood risks effectively to the Dutch population, while at the moment a broad belief exists that the government will guarantee flood safety? Third, for how far individuals would be ready to act upon protecting themselves from flood risk in addition to flood safety measure taken by the government?

A number of issues surface as we proceed. For example, the knowledge of the current state of public risk perception is imperative to starting a broad campaign on raising risk awareness. A report from the two Dutch ministries (MVW & MBZ 2007) has recently become available sketching an overall picture of flood risk perceptions in the Netherlands. The evidence points

at the fact that on average Dutch population would not be concerned about flood risk in the country. Furthermore, while the Dutch government is striving to improve flood risk awareness, the report argues that the raise of risk awareness on its own might not have much sense if it does not lead to a desirable shift in behavoiur pattern among the public. This finding offers a direct implication for our inquiry, as it means that not only we should look at the perceptions of flood risk and their determinants *per se*, but rather, given specific level of risk perception, provide a link to the factors that trigger individuals to protect themselves from a hazard.

To examine individual cognitive perception of risk and the behavioural intention to undertake individual risk-reducing action, and to identify those triggers that should be used to effectively communicate risk, we apply in this study the combined protection motivation theory (PMT) and transtheoretical stage model (TTM), which are borrowed from health psychology literature but have also been effectively applied in the natural hazard context (see for example Block & Keller 1998, and Martin et al. 2007). Due to strong reliance upon collective protection from flooding, we expect that the majority of the Dutch public would be found in the precontemplative decision stage with moderate to low risk knowlegde level. This would mean that a shift of a part of responsibility for taking flood risk reducing measures from public to individual domain would require a number of in-between stages, each of which would need a different set of strategies (as well as time) to make this shift successful.

The remainder of this article is organised as follows. In section 2 we shall set off with a reflection on flood management policy in the Netherlands. Section 3 will follow with a short explorative study on flood risk perception. Section 4 will deal with theoretical background of models predicting bevahioural intention and will describe the main traits of the selected PMT-TTM approach. Section 5 will follow with he description of data and the results of analysis. Sections 6 and 7 will close with discussion, conclusions and policy implications.

2 CURRENT STATE OF FLOOD MANAGEMENT POLICY IN THE NETHERLANDS

During the past decade more explicit discussions of issues related to flood safety have taken place in the Dutch policy-making realm and the society at large. The return of flood protection on the political agenda was secured by the (near) floods and evacuations in 1993 and 1995 in the Meuse, which were recently intesified by the flooding following hurricane Katrina in New Orleans, US in 2005. The latter made such questions rise as: Could a major flood be a reality in the Netherlands? And: What would be the consequences of such a major flooding? The debate on ‘giving room for the river’ keeping low profile before Katrina provided a signal of change in water management philosophy from keeping water outside to a more ‘natural’ approach where water began to be seen not solely as a threat, but also as an opportunity. Thus, coming to friendly terms with water would mean allowing it to go ‘its way’, for which special retention areas were selected that could be used for controlled flooding aiming at preventing uncontrolled flooding elsewhere in case threatening river discharges are detected. Although this policy has not received broad public support (for example, this measure was fiercely opposed by the inhabitants of Nijmegen), it has marked a new era in the Dutch flood protection and water management, when public began to be involved in water-related decision-making. This meant conseqeuntly that top-down way of centralised policy-making and measure implementation, that was practiced for the last decades (sealed by a public mandate, when after the flood disaster of 1953 the government

made a promise to take care of flood protection in the Netherlands and do everything to prevent another disaster), has to be changed, and in fact has already begun to change[1]. Inclusion of a spectrum of stakeholders on the local level (like inhabitants of a respective area, representatives of interst groups and business) required from local governments and water boards new skills of flood risk communication, and from the involved stakeholders – new skills of conscious risk assessment and decision-making under the conditions of uncertainty. While in some cases this new sort of public involvement in decisions around flood safety was a success, it proved that important insights were still missing with respect to the extent of risk awareness among the public and risk communication (strategies). More recent documents from the Dutch government (De Boer et al. 2003; DGW/WV 2006; MVW & MBZ 2007) witness higher concentration of attention on the issue of flood risk communication and raising flood risk awareness of the general public, which can be interpreted as an important sign of a shifted focus in flood management in the Netherlands from public domain to public-private mix and goes together with the shifted attention from controlling flood probability to flood risk management (including both the probability and the consequences of a flood).

Furthermore, while the shift in water management that we are sketching (that is remarkable by itself) is yet slow, we notice an important aspect that is yet missing as pointed out by MVW & MBZ (2007, p.37): an overarching, recognisable strategy in flood risk communication. Furthermore, it has been repeatedly reported that a strategy cannot be formulated without a clear statement of the purpose that risk communication should serve. This means that first of all, a well-specified flood management philosophy or a policy goal should be identified, on which risk communication strategy will hinge. This way, desirable outcomes can be targeted, such as particular changes in individual and/or collective behaviour that would facilitate the implementation of a designated policy.

Two important notes are at place here. First, at the moment, we may observe a situation in the Netherlands, when government has not yet formed or expressed a particular goal which flood risk communication should serve. For example, MNP & RIVM (2004), as well as DGW/VW (2006), MVW & MBZ (2007) mention two potential purposes: a) creating a platform for conscious public support for the implementation of government flood protection measures; and b) increasing the coping ability of the public (resilience) in case of a flood event. It is interesting to note that in fact such possibility as stimulating individuals to engage in private flood protection activities in addition to the measures taken by the government on the basis of shared responsibility for flood safety in the Netherlands is not explicitly considered. The issue is not straightforward: the question whether the responsibility for flood protection should lie within the (central) government or private actors, or should be shared between the two, is one of the points of heated debate within academic and professional circles. On the official level, much caution is excercised with respect to the option of shared responsibility, and it seems that for the time being flood protection responsibility will remain in the hands of the government, while careful steps are intended to be taken in the direction of involving the general population to this topic. An essential warning should be expressed here that in case risk communication does take place without a prespecified purpose, the message of the campaign might not be focused, and therefore it might lead to unforeseen (unexpected or even undesirable) results, like panic, ignoring the message altogether or taking overporportional protection actions.

[1] For a more detailed description of Dutch water management policy in the past century, see for example, Bockarjova, Steenge and Hoekstra (forthc.), Wesselink (2007).

The second issue is that alongside with risk communication, other ways of raising risk awareness are currently considered by the Dutch government as well, such as financial incentives (like taxes and subsidies) and regulation (by means of rules and laws). Each of the three – communication, financial incentives and regulation – can be chosen as a basic strategy; or all of them can be used complimentary to each other in a mix of measures. Before the decision is made, however, various option should be studied, and in this contribution we will focus on the exploration of risk communication line.

3 THE ROLE OF RISK PERCEPTION

We shall start with the issue of risk perception. Following the literatrure, risk perceptions influence risk acceptance and attitude, and consequently the formation of individual decision-making related to risk. Two main theories are often used to analyse risk perceptions, namely, the cultural theory (CT) and psychometric paradigm (PsP). The latter, psychometric model founded by Slovic (1989), emphasises such risk characteristics as novelty and catastrophic potential (as opposed to chronic nature of events) in addition to the often mentioned qualities of voluntariness, severity, familiarity, immediacy and controllability. Alternatively, the former, the cultural theory (introduced by Douglas & Wildavsky in 1982), includes the inequitable distribution of risks and benefits, artificiality of risk source (with respect to nature, history and justifiability of risk), (potential for) blame, and distinguishes between personal and institutional control, alongside with voluntariness, familiarity, dread. Empirical studies using these frameworks have shown that risk perceptions, and in particular the determinants of risk perceptions do influence individual valuation of risk. However, they vary significantly across various risk contexts, so neither framework was in fact empirically verified to offer a stable prediction pattern. We could conclude from these observations that, although the CT and PsP theories provide important insights in determinants of individual peception, we would ultimately need a more refined theoretical framework for the analysis of issues related not only to risk perception, but rather to risk communication and change in behaviour as a result of risk communication. However, before dismissing the CT and PsP theories we propose that a reflection on risk context at hand (flood risk) is a necessary precondition for our further analysis in the face of method transferability. We feel that without thorough understanding of the nature of flood risk, methods from other risk contexts may not be directly applicable for the problems we have at hand.

3.1 *Flood risk perception*

The importance of accounting for qualitative risk characteristics is advocated by Gaskell and Allum (2001), where it is concluded that “the concept of risk means more to people than an estimate of its probability of occurrence; it is much more complex than this. Hence the widely accepted method of measuring risk magnitudes in terms of the number of fatalities per year is argued to be inadequate (Royal Society 1983; Slovic 1987), as it fails to capture the way people actually understand the term.” We observe that the authors make a crucial difference stating that qualitative characteristics of risk are essential for the *understanding* of risk. Thus, other characteristics of risk in addition to quantitative representation of probabilities should contribute to obtaining a better grasp on a particular risk as well as help us explain it to the public. This finding may be especially relevant for the flood risk research in the Netherlands, where the probabilities of a flood in various dike ring areas are very low (ranging from 1/500

to 1/10.000), and probabilities of a fatality due to flooding are indeed tiny (from 1/1.000.000). Some authors (e.g. Dickie & Gerking 2001) argue that general public has difficulty in assessing (changes in) probabilities adequately that are smaller than one in a thousand. Adopting such an assumption would then justify the relevance of illuminating additional risk characteristics if we want to combat a survey study of flood risk valuation in the Netherlands.

We shall briefly reflect on our findings from an explorative analysis of a number of recent studies and overviews of flood perceptions in the Netherlands (MNP & RIVM 2004; MVW & MBZ 2007; Terpstra & Gutteling 2007) based on risk characteristics stemming from psychometric paradigm and the cultural model. We can preliminary conclude that flood risk in the Netherlands is perceived as relatively involuntary (judging on risk voluntariness as a common PsP and CT characteristic), which however may be biased by the historically developed lock-in effect[2]. With respect to another PsP/CT risk characteristic, risk severity, the Dutch population is suggested to have a moderate dread perception, and while more inquiry is needed in this direction, for now this outcome can be considered adequate. Similarly, better understanding should be gained with respect to immedacy of effects (PsP variable), as it might affect personal valuation of flood risk costs and benefits in decision-making processes. Two CT characteristics were considered corresponding to our expectation and were deemed adequate, which are the distribution of risks and benefits (perceived as fair) and the potential for blame (perceived to lay within the government as the provider of flood safety).

Further, the following risk features were identified with expectedly most divergent expected and observed perceptions: ‘risk controllability’, ‘familiarity/ knowledge’ (both PsP/CT characteristics) and ‘risk exposure’ (PsP risk dimension) where we noticed a serious clash between the private and public factors in recognising and dealing with risk; ‘periodicity’, ‘novelty’ (PsP characteristics), ‘risk dynamics’ and ‘source of risk’ (CT variables), which describe the (changing) environment of flood risk itself. According to the taxonomic model of Raaijmakers et al. (2008), low knowlegde (or what they call ‘awareness’) in combination with low control (or, what they call ‘preparedness’) and high worry may lead to the demand for more protection; however, low knowledge together with low worry and high hazard control implies, as we might consequently suggest, - an (ignorant) safety feeling. We see this combination of risk perception factors – currently observed in the Netherlands – as alarming and suggest to treat them carefully in designing flood risk communication strategy.

In the next section we shall continue with building up a framework for a profound analysis of flood risk perceptions in the Netherlands in relation to the motivation of people to undertake protective action and studying consequent behavioural change.

4 MODELLING MOTIVATION TO ACT UPON HAZARD

4.1 *Theoretical background*

As we have outlined in the beginning of this paper, our current inquiry is mainly aiming at exploring individual flood risk perception in the Netherlads in conjunction with raising awareness and motivating some desired behaviours of the Dutch public towards flood risk protection. So far we have provided an exporative analysis of flood risk perceptions based on

[2] More on the lock-in effect see among others Woerdman (2004).

two theories of cognitive perception. We have noticed that these frameworks, although helpful in identifying (mis)percpetion 'bottlenecks', do not offer wide theoretical grounds for the systematic study of a problem at hand. This means that we need to adopt a different approach that would be able to connect risk perception and action upon protection. Unfortunately, natural hazard literature does not present us with a ready solution; studies of natural phenomena characterised as low probability – high consequence events are even less abundant. However, a variety of theories explaining human decision-making and behaviour under conditions of risk and uncertainty are found on the edge of such fields as health care, environmental studies, natural hazards, psycholgy and economics. One of the promising candidates is a combined approach applied to the analysis of individual motivation to protect themselves against wildfires in the US (Martin et al. 2007), which was borrowed from health care literature (Block & Keller 1998).

In fact, clinical psychology, health education and health risk communication studies offer a wide variety of theories and approaches to study risk perceptions, motivation and action. Among others, such theories circulate as Health belief model (HBM) by Becker (1974), Rosenstock (1974); the theory of planned behaviour and reasoned action (TRA) by Ajzen & Fishbein (1980), Ajzen (1988, 1991); Protective action decision model (PADM) by Lindell & Perry (1992, 2000); Person-relative-to-event model (PrE) by Mulilis et al. (1990), Mulilis & Lippa (1990), Mulilis & Duval (1995); Subjective expected utility (SEU) by Savage (1954); Protection motivation theory (PMT) by Rogers (1975), Bandura (1977); Maddux & Rogers (1983); Weinstein (1989); and Trans-theoretical model (TTM) by Prochaska & DiClemente (1982); Weinstein et al. (1998).

The listed models have a lot in common, for example, Health belief model (HBM) is based on four main constructs of susceptibility and severity of risk, benefits and barriers of protrctive actions, to which self-efficacy was added later on to improve the predictive capacity of the model in explaining health behaviours. The five elements are very similar to the vulnerability, severity, self-efficacy and response-efficacy alongside with costs and benefits of protective action elicited by the Protection motivation theory (PMT), which examines the impact of information on the elicitation of both risk appraisal and coping techniques. The theory of reasoned action (TRA) intends to explain the discrepancy between attitude to risky activities and behaviour, and proposes that intention is a best predictor of bahaviour, which is in turn influenced by three factors: individual attitude towards a specific behaviour, subjective norms and perceived behavioural controls. This approach is conceptually close to the subjective expected utility model in the sense that it inspects the subjective side of perception of a risky activity. Person-relative-to-event (PrE) theory predicts the emergence of protective action under conditions of increased fear at the presence of sufficient resources relative to the magnitude of threat, which are similar to the vulnerability, severity and response-efficacy elements of PMT. The subjective expected utility (SEU) model put forward by Savage back in 1954 describes decision-making in the presence of risk and is based on the perceived individual utility that is maximised based on the perceived costs and benefits of a risky activity. The implementation of the method is deemed tedious (as well as TRA), and consistency of individual utility remains a problem. Yet, the principle of weighing the costs of protective action against the benefits it might bring, central to SEU, is also present in other models such as HBM, PTM, TRA and PADM. In the latter approach, the protective action decision model, actions in response to threats can be defined by a series of stages like detection/warning, psychological preparation, logistical preparation, and protective action selection/implementation (however, most recent empirical evidence do not seem to satisfactorily support the theory, see Lindell & Hwang 2008). Finally, the trans-theoretical model (TTM) representing decision stage theories is a behavioural change model that

emerged from clinical psychology. TTM identifies six stages of what is called ‘successful self-change’, or the degrees of readiness to act upon danger, which are shown to influence individual motivation and intention to protect themselves from a risk. These ordered stages are pre-contemplation, contemplation, preparation, action, maintenance and termination, however only three of them are usually included in empirical studies (pre-contemplation, contemplation and action). The important implication of TTM is that depending on the decision-making stage with which a group of individuals is identified, an effective communication strategy can be designed in order to stimulate their progressive ‘movement’ from one stage of action to another.

4.2 *The adopted model*

From the brief overview of selected literature in the previous section it is clear that numerous theoretical frameworks exist in approaching protection behaviour in various risk contexts. However, the most appealing approach to apply in our case seems to be the combined PMT-TTM model. It possesses attractive theoretical flexibility by assuming multiple behavioural stages, as well as it is well operationalised in applied research which offers a fair grip on the measurement of variables of interest. The combination of the protection motivation theory with the transtheoretical model (first suggested by Block & Keller in 1998 in health-related context and followed up by Martin et al. in 2007 applied in the context of natural hazards) offers an elegant theoretical mix for addressing the problems of risk communication in conjunction with affecting actual protective behaviour. Predicted shift in behaviour is modelled by looking at the intention of people to take protective action, which is the variable that we can observe during the conduction of the survey. The combined PMT-TTM model offers risk information and risk perception dimensions on the one hand and stage readiness for action on the other hand to predict people’s motivation to act upon the hazard, that is modelling behavioural change in taking protective action step-wise.

So, PMT part consists in fact of two processes: threat appraisal and coping appraisal. Threat appraisal comes first, implying that individuals should first realise and personalise particular risk before considering adaptive behaviour. This means that it is important that 1) risk is admitted as such, and 2) risk is admitted to pose a threat to individual in question. Thus, the first process, threat appraisal, consists of four elements; it is strengthened by perceived severity of hazard, and personal vulnerability to a hazard; it is weakened by the the high valuation of intrinsic and extrinsic rewards connected to maladaptive behaviour. The second process of coping appraisal is facilitated by a strong belief in response efficacy (the perceived effectiveness of alternative mesures) and perceived self-efficacy, i.e. the ability to perform protective actions. These two efficacy measures should be weighted against the costs of engaging in protective behaviour, which can be as material (money), as immaterial (time, effort or inconvenience). The result of going through the two (sequential) processes of threat and coping appraisals would lead to either adoption or neglection of protective behaviour. This ultimate individual yes-no decision regarding the engaging in risk reducing actions, however, is rather a black-and-white version of a more colourful reality. Therefore, we assert that TTM model with multiple stages of action should offer a refined view on the matter.

Basically, TTM posits that individuals can be found at various stages of action, which can be labeled as ‘do nothing’, ‘perform protective actions’, as well as stages in between the two, such as ‘considering change’ or ‘perform some action but not consistent’, as well as ‘maintain adaptive behaviour’ and ‘quit’. Such a look at behaviour opens a wider palet of possibilities in tracing the change from no behaviour to systemaic protective behaviour through a number of

stages. Essentially, the strong point of adding TTM to PMT approach is the ability to identify and influence the change process from pre-contemplation, via contemplation and preparation, to action and maintenance stages. Thus, not a one-advice-fits-all strategy is followed, but rather those (different) triggers are identified that influence people's motivations at different stages of decision-making process. Both Block & Keller (1998) and Martin et al. (2007) provide a detailed conceptual background on the methods and also succeed in applying the new combined approach to their case studies. Thus, this methodology not only provides explanation for individual engagement into protective bahviours, but lends itself to extract implications for *influencing* individuals in performing desirable protective behaviours.

We have proposed that the combined PMT-TTM approach offers us an advantage by assuming the existance of varying motivations to act on risk depending on the decision-making stage. This means that transition between the action stages borrowed from TTM (which should by the way not necessarily be sequential) can be followed and thus influenced by the four cognitive processes described by PMT. In particular, literature has repeatedly confirmed the finding that the degree of perceived risk severity, vulnerability, self-efficacy and response efficacy are key motivators to make people move through the stages of precontemplation, contemplation and action. As Martin et al. (2007) put it, "Strong beliefs in severity, vulnerability, self efficacy and response efficacy will arouse the motivation to protect oneself and one's property and result in a change in the adoption rate of risk reduction behaviors." In particular, state-of-the-art in risk behaviour research has shown that the stress on the variables guiding threat appraisal should govern behavioural intention at pre-contemplative and contemplative stages. Namley, the perception of vulnerability among the precontemplatives proves effective to make them move to the contemplative stage; while strengthening the perception of severity of danger would stimulate contemplatives to turn to action. Finally, at more active stages, individuals are rather triggered by the variables influencing coping appraisal; it appears that improved response-efficacy and the perception of self-efficacy would help those who are already found in the action stage remain engaging in protective behaviours. This differentiated PMT-TTM approach to influencing personal behaviour should also prove suitable for our study in the Netherlands where we expect varying motivations to exist, as well as to vary across the respondents in different regions of the country. Ruthermore, proposed approach based on identifying particular target groups in terms of protective action motivation on the regional basis should facilitate the design of relevant location-specific risk communication tools.

The model is extended with the inclusion of trust and subjective knowledge variables as a highly relevant aspects of flood risk context in the Netherlands in order to predict motivation to take protective action. Provided flood safety is rather a public good, trust in government or lack thereof should act as a connecting link between risk perception and efficacy measures on the one hand to the responsibility of taking additional protective measures on the other hand. Uslaner (2007) poses that trust shapes attitudes towards risk, and further suggests that trusters downplay the level of insecurity. This means, that our hypothesis is that due to underestimated risk, trusters would be to a smaller degree expected to engage in protective behaviour. We would be interested whether the hypotheses that high trust level implies lower risk perception and thus lower motivation to act upon hazard holds in the context of flood risk. Alternatively, low-trusters may well be expected to overestimate danger, be less reliant on collective action and thus more inclined to take additonal measures themselves.

To sum it up, we aspire to test the following working hypotheses by applying the combined PMT-TTM approach to flood risk context in the Netherlands:

[1] PMT offers a basic framework for prediction of behavioural intention to act upon self-protection against flood hazard in the Netherlands

[2] TTM offers an extention to PMT model insofar that it allows prediction of behavioural intention to act upon self-protection against flood hazard depending on the intention stage respondents are found in

[3] behavioural intention for respondents found in the action stage would be predicted by self-efficacy and response-efficacy

[4] behavioural intention for respondents found in the contemplation stage would be predicted by perceived risk severity

[5] behavioural intention for respondents found in the pre-contemplation stage would be predicted by perceived risk vulnerability

[6] due to reliance upon government, high trust level among respondents would imply lower risk perception and thus lower motivation to act upon hazard

[7] due to higher awareness, high level of subjective knowledge about flood hazard among respondents would imply higher risk perception and thus higher motivation to act upon hazard

[8] own experience with flood, evacuation or nuisance, as a proxy for availability heuristics, would lead to higher risk perception and thus to higher behavioural motivation to undertake protective action

[9] due to geographical differences, differences are expected between the four studied areas in terms of flood risk preparation stage and thus motivation to act upon flood risk protection.

5 DESCRIPTION AND ANALYSIS OF DATA

5.1 *Construction of variables and descriptive statistics*

We apply a survey to explore cognitive perceptions of flood risk in the Netherlands and to explore the possibilities with regard to improving hazard response in acting upon flood risk protection. The design of the survey consisted of a testing stage in the form of a small-scale pilot study (Apr-Jun 2008) and a final large-scale survey (Sep-Oct 2008), that was distributed via TNS NIPO using their panel among about 1400 Dutch households located in 4 flood-prone areas along the coast and the riverside, with varying levels of protection (legal standards prescribe the following overtopping probabilities for the intended dike ring areas: 1/10.000 yrs; 1/4.000 yrs; 1/2.000 yrs; 1/1.250 yrs).

Current survey is built upon the original survey of Martin et al. (2007) which allows us testing the findings of the american authors in a new context. By including additional aspects of trust and knowledge, we attempt at extending the scope of the model, that should hopefully improve the insight into the way risk perception and efficacy indicators influence personal motivation to act upon hazard that PMT-TTM approach offers.

The independent variables are constructed using 11-point scale form 0 to 10 (see Appendix I for precise formulation of questions). These belong to the two PMT processes, as well as add extra measures of perception. PMT threat appraisal include: VULNERABILITY – a single question on the estimated likelihood of flooding in the place of residence in the coming 50

years; SEVERITY scale (3 measures); EXTRINSIC AND INTRINCIS REWARDS scales (6 measures). Nothe that we measured rewards for taking protective action, which are the opposite of the rewards for taking mal-adaptive action, used in the standard PMT threat appraisal (we therefore expect an opposite effect of rewards on behavioural intention). Next are the coping factors, such as: SELF-EFFICACY scale (8 measures) and RESPONSE EFFICACY scale (8 measures) - both constructed based on the 8 specified risk-reducing measures suggested to the respondents. COSTS scale (4 measures) are formulated in terms of time, effort, inconvenience and money to be spent on the proposed measures. Perception variables added include subjective KNOWLEDGE (3 measures) and TRUST IN GOVERNMENT (4 measures), as well as experience with flood, evacuation or water nuicanse.

The dependent variable is COMPOSITE BEHAVIOURAL INTENTION MEASURE and is an average of 8 measures valued on a 5-point scale, which was developoed following Martin et al. (2007): 1 – will not do; 2 – will do within a year; 3 – will do within 6 months; 4 – will do in 1 to 3 months; 5 – already done. So, the higer the score, the higher the stated behavioural intention to undertake protective action. We have further divided the respondents in our sample into three INTENTION STAGES to act upon risk reduction: "Action", "Contemplation" and "Precontemplation". Respondents who answered 'already done' to 3 or more measures were classified in the action group (N=177); which is just 1/8 of the sample and is the smallest group. Those who have marked 5 or more actions as 'will not do' formed precontemplative group (N=743); this is more than a half of the sample, 53.7%; all other respondents fell into the in-between group of contemplation (N=491), which is about a third of the respondents (34.5%). It is clear that precontemplatives are in majority, and the action group is clearly outnumbered.

Table 1A shows the descriptive statistics of dependent variables per intention stage. We can see that the three intention stages differ in terms of overall intention readiness (at 1% level) that rises from 2.16 for precontemplatives through 2.56 for contamplatives to 3.16 for action respondents, which is to be expected. Most of other PMT variables are evidently revealing a trend: Vulnerability, Severity, Self- and Response Efficacies, and Benefits are significantly higher (at 5%) for contemplatives and action respondents relative to pre-contemplatives. This is a pretty intuituve result as well, as those who do not feel vulnerable, who do not consider the consequences of a flood as severe, as well as who do not see themselves or the measures effective enough would have the least incentive to undertake risk-mitigating action. Costs is the only index out of the PMT variables that is about the same for all three groups. For other perception variables, Subjective knowledge is the lowest with pre-contemplatives; yet trust in government score is the highest, which might point at the fact that these respondents are most reliant on the state as the provider of public protection from flooding. Also respondents with prior water calamity experience is the smallest in the precontemplative group. Results of ordered logit modelling (not reported here) support these observations.

5.2 *Modelling: regression analysis*

We used regression analysis in order to establish relationship between the dependent variable of behavioural intention and the independent variables from PMT model, as well as other related variables such as subjective knowledge of flood risk, trust in government, prior calamity experience. We have also included regional dummies to test whether behavioural intention to take protective action is determined purely by regional differences. The results of OLS regressions are found in Table 2A in Appendix.

We have run two models: basic model where only PMT variables were included (a “short model”) and another one where additional variables were included, (an “extended model”). Both models were run for the whole sample, as well as for each identified intention stage seperately to identify stage-specific behavioural predictors.

If look at the results of **the short model** for the enire sample, we can see that all beta’s have expected signs, meanin that higher perception of personal vulnerability, efficacy, response efficacy and severity of consequences would lead to higher levels of behavioural intention to undertake risk reducing measures. Higher incurre dor expected costs of action would decrease intention readiness; while expected higher rewards (or benefits) of adaptive behaviour would result on average in higher intention scores. However, not all of these variables appear significant; so, only vulnerability, response efficacy and costs explain the variation in intention scores – these beta’s are significantly diffirent from zero (all at 1%).

We can also report on the differences in exogenous variable significance across the intention stages fro this model. So, for action stage these are, surprisingly, vulnerability, costs and intrinsic and extrinsic benefits that determine the height of behavioural intention. Surprisingly because only costs from the three significant variables belongs to the coping appraisal, which is deemed to be the trigger in the action stage. Vulnerabilty (just above 5% level) and benefits (at 1%) are unexected predictors from the threat appraisal process. Yet, this might not seem that bizar if we recall how action stage dummy wasconstructed – for 3 or more actions that were marked ‘already done’ out of 8 suggested measures. In fact, the threshold of 3 actions was chosen in order to keep the groups in relative balance (now our action group comprises 12.5%; a cut-off value of 4 would imply mere 2% which would mean too few observations in relative terms for this group). So, our action group might not be considered that ‘active’ comparing to other research, for example such as Martinat al (2007) where action group was 7 and more actions undertaken out of 11 measures.

For the contemplatives, the short model resulted in a single significant predictor of intended behaviour, namely response efficacy. Here, again not this variable, but rather vulnerability and severity as part of threat appraisal, would be expected to define intentions at this stage when individuals have started the change in the desired direction, but are not yet consistent in their effort.

An even more mixed picture is found with pre-contemplatives, respondents who are not willing to change (we recall that thit is the largest group in our sample, 52%) – they have rejected to perform at least 5 measures out of 8. Behavioural intention at this stage is determined by the feeling of vulnarability (yet at meagre 10%) and costs (at 5%) from the threat prosess. However, two other determinants are less expected: response efficacy (at 1% level), and intrinsic and extrinsic rewards connected to performing adaptive behaviour – yet, in a negative way, explain the variation in the composite intention index. The negative sign of the assumedly behaviour-facilitating banefits is striking; however, the possible explanation for this anomaly may lie in the contribution of offered private measures in relation the collective public measures taken by the government to the final level of flood protection. We shall return to this point later on when we discuss the extended model.

The results of **the extended model** where additional perception variables are included mimic those of the short version for the whole sample.we can see that from the PMT explanators, severity, costs and self-efficacy remain significant and have expected signs; yet

vulnerability has seriously lost its significance (now at 10% level). In addition to these behavioural intention determinants, subjective knowledge, trust in government and own prior experience with water calamity are significant at least at 5% level. We thus find that higher subjective knowledge, on average, would lead to higher intention to undertake protective action. Also, respondents with prior experience with evacuation, flood or water nuicance would score higher in intention index. Respondents with higher level of trust in government would, on the opposite, be less inclined to be personally engaged in risk-reducing behaviours, probably rather delegating flood protection management entirely to the authorities.

Following the extended version of the model, action respondents are motivated solely by the costs and benefits of taking protective actions from the PMT palette (vulnerability has lost its significance in this version). Further, subjective knowlegde directly influences behavioural intention in this context (at 10% level); trust in government is rather a hinder as it resembles a negative relationship with the composite intentions measure. It is interesting to recall here that action group has the lowest trust score (see Table 1A for ANOVA results) relative to all other respondents, which might imply that action respondents do take (or have already taken) flood-protection measures just because of their lack of trust in government.

Contemplation group has also gained an additional explanatory variable in the extended version: in addition to response efficacy (sign.at 1%), subjective knowledge (sign.at 5%) determines the readiness to act upon self-protection for this group. At the marginal 10%, also severity and costs enter the picture. The contribution of these last two variables cancels each other, as the positive influence of perceived severity of consequences is dampened by the negative effect of costs (time, effort, inconvenience and money) on the intentions measure.

For pre-contemplation group, extended model has brough some changes: now vulnerability (received likelihood of flood) has become more important (sig.at 5% level), while costs has lost significance (from 5% to 10%). Extrinsic and intrinsic benefits of taking protective action, as well as response efficacy remained significant, thus contributing to behavioural motivation; benefits, yet again, with the unexpected negative sign. Further, trust in government is marginally significant (at 10%), and positive – opposed to trust beta for the action group which is negative. This positive relationship implies that higher trust in authorities leads to higher behavioural intention to undertake action. Remarkably, pre-contemplatives (together with contemplatives) have a higher degree of trust relative to action respondents. This leads to theconclusion that possibly pre-contemplatives rely on the authorities regarding protective action; more than that, the negative sign of the benefits for taking prpotective action might point at the fact that these respondents consider individual action (even if rewarding individually) of such a minimal importance relative to activites that government is taking or should be taking, that this individual action is foregone.
Finally, precontemplative group is the only one, for who regional dummies are significant in defining the behavioural intention: residents in Land van Heusden / de Maaskant and Zeeland are more motivated to undertake action in this sub-group than other respondents.

6 DISCUSSION OF RESULTS

Having desscribed the run models based on PMT-TTM framework, we can now reflect upon our working hypotheses that we have proposed in Section 4. The first two hypotheses concern the chosen theoretical model and its suitability for the purpose of our research. We can say that they should not be rejected as all the models on which we have reported in this article are

statistically significant. While in PMT model – short and extended models for the whole sample – not all intention determinants appeared to be significant (only vulnerability from threat appraisal prosess, and response efficacy and costs from coping appraisal process), it add to the explanation of intention motivation. TTM – short and extended models run per intention stage – proved to be significant and brought varying motivations to undertake action to the fore for respondents found in different action stages. However, and it has to do directly with the next three hypotheses, not for all stages we could confirm motivation predictors following the theory. We have to reject hypotheses [3] and [4], as not self-efficacy and response efficacy, but costs and benefits of undertaking protective action determined behavioural motivation for action respondents. For contemplatives, not risk severity, but rather response efficacy triggered higher intention (severity did appear marginally significant in the extended model, but it won't be reasonable to cou nt this as a hit). Prediction of motivation to take individual protective measures in the precontemplation stage, as expected, was determined by vulnerability (at 10% in the short basic model, and at 5% in the extended model) – so, hypothesis [5] is not rejected; yet it was not the only predictor. Also costs and benefits of risk-reducing behaviour, as well as response efficiacy contributed to the respondents' motivation at this stage. Yet, surpisingly, benefits appeared to have a negetive relationship with motivation, which might stem from the perceived insignificance of effects of individual action compared to public flood protection measures.

Three following working hypotheses describe the expected relationship between protection motivation and risk perception avriables. So, hypothesis [6] postulates that trust in government would imply lower risk perception and thus lower motivation to act upon hazard. We have found pretty much support for this hypothesis; in particular, it held true for the PMT formulation (extended model, whole sample), as well as for the action stage in TTM framework (in both cases trust beta was significant at 5% level). However, for the precontemplation stage trust in authorities seemed to change from impediment to undertake action to a facilitator: at meagre 10% significance level beta was positive meaning higher trust would lead to higher behavioural intention.

Hypothesis [7] on subjective knowlegde should not be rejected as it turned to be highly significant in the PMT context (extended model, whole sample) in predicting intention to undertake risk-reducing action, as well as in the contemplative stage (and less so in the action stage). It is impotant that the sign remained everywhere positive signalling that self-reported knowledge about flood risk has a positive influence on individual motivation. This finding is in line with results of Martin et al (2007) as well as Neuwirth at al. (2000).

Hypothesis [8] regarding own prior experience is found to hold for PMT, yet not for any of the intention stages separately. In the PMT context, prior water-calamity experience with evacuation, flood or nuisance would motivate respondents more to undertake action than those without such experience.

Finally, we have not found sufficient support for hypothesis [9] regardinf regional differences in flood risk perception and behavioural motivation. Essentially, regional variation surfaced only for the precontemplation group, where respondents residing in the dikerings Land van Heusden / de Maaskant and Zeeland would rather be motivated to undertake action in the precontemplative stage than respondents in Central Holland. Though it might not seem that prominent, this finding can still be an important result, as precontemplatives form the largest part of our sample, namely 53%. This means, that in appealing to this roup, regional differences should not be underestimated.

7 CONCLUSIONS AND POLICY IMPLICATIONS

In the previous section we have reviewed the results of our modelling exercise and we can conclude that our working hypotheses have been partially confirmed. Important findings of this research is that PMT model offers a good basis for analysing protection motivation of individuals in the context of flooding in the Netherlands. We can conclude that, in general, threat appraisal process influences the motivation of respondents to take protective action only through perceived vulnerability to flood (in terms of perceived likelihood), which yet proved to be unstable through the models; rather, individuals are systematically motivated by variables comprising coping appraisal proccess, namely response efficacy and costs of taking protective action. Further, on the sample level, higher subjective knowledge would mean higher behavioural intention, and so does prior personal experience with water calamities; trust in government, on the other hand, would be a disincentive to engage in risk reducing activities.

However, PMT does not tell the whole story; we have refined PMT extending it with TTM approach, where respondents were divided into three intention stages: action, contemplation and precontemplation in order to identify stage-specific determinants of motivation for protective behaviour. We have found that, as expected, these determinants differ across the three defined stages. In order to motivate the '*action' group* (respondents who have already undertaken 3 or more out of 8 suggested measures), their perception of intrinsic and extrinsic benefits of engaging in protective behaviour should be increased, and the perception of costs associated with taking protective action (such as time, effort, inconvenience and money) should be decreased. Hoewer, it is important to mind here that this is a group for who trust in government acts as an impediment for taking action: the more they believe in the authoroties, the less they intend to do thmeselves to mitigate the hazard. Perceived knowledge about flood risk is marginally important, yet improvement in knowledge about flood would increase they readiness to take action. Communication to this group should concentrate on the costs and benefits of protective action: stressing the height of benefits both for the individual and for the society, in relation to the costs. Besides, it would be important to show that government needs the cooperation of the population in securing flood safety and taking individual protective action is an absolute necessity.

For respondents in *contemplation stage*, response efficacy appered to be the strongest trigger among the PMT variables behind the motivation to act upon risk reduction; severity of consequences and costs of protective actions played a role, yet on the margin. From other included variables, subjective knowledge was positively related to behavioural intention to undertake risk reducing activities. Thus, a strategy focused on provision of extra information about flood hazard in the Netherlands, and flood consequences in particular together with clear explanation of the effectiveness of proposed measures should be the key to the contemplative group in order to set them in action.

Pre-contemplation group is by far mostly affected by the height of perceived vulnerability to flooidng and response efficacy in relation to behavioural intention for self-protection; less so by self-efficacy and the costs incured. An important note is in place, namely on the benefits of protective actions and trust in government that have unexpected effects on respondents' motivation. For this group, targeted communication of information concerning flood likelihood in the place of residence together with response efficacy of a number of proposed flood risk reducing measures should be run. At this stage, benefits of taking protective action should not be emphasized as they only seem to delude the attention from the effectiveness of

potential protective action. In addition, the importance of trust gear to pre-contemplatives can be used by profiling the message about personal protection as a gesture of copperation of the public with the government in achieving the common goal of flood safety.

In conclusion, we should mention a number of critical issues that surface. First, the biggest part of population in the Netherlands is not found in action stage regarding self-protection from flooding: pre-contemplatives are about the half; together with contemplatives they easily form a convincing majority. We would therefore suggest to start with appealing to these groups.

Perhaps a second general advice on communication concerns our findings on the role of subjective knowledge in forming the motivation to undertake risk-reducing activities: 1) it is important to communicate about flood hazard as improved general awareness would mean higher level of motivation; 2) use targeted communication to highlight those aspects of threat to specific groups that are most relevant for them.

Next, costs of protective action proved to be important to respondents (with varying significance) at every stage of preparedness. This means that decreasing the perceived costs, be it time, effort, inconvenience or money, would significantly reduce the impediments for adopting protective behaviour. Perhaps, a monetary contribution of the government to the costs made (as tax relief, subsidies etc.) should help outweigh the balance in favour of self-protection.

Finally, while designing communication to the public, and targeting particular groups (pre-contemplatives, contemplatives or action), regional potential in adopting desirable behaviours should be explored. In particular, our results point at the possibility that residents in some regions might be more inclined to act upon self-protection than in others. This means that these areas may be approached first, and if prove to be a success, might act as examples-to-be-followed for broader communication campaign.

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APPENDIX I.

Description of variables

VULNERABILITY

(11 point scale; 0 = zal zeker niet gebeuren; 10 = zal zeker gebeuren); mean = 4.40

Hoe waarschijnlijk denkt u dat er zich in de komende 50 jaar een overstroming in uw woonomgeving voordoet?

SEVERITY

(3 items on a 11 point scale, 0 = helemaal niet ernstig / geen schade; 10 = heel ernstig / rampzalige gevolgen; or 0 = geen vertrouwen; 10 = vol vertrouwen)

Cronbach's alpha = 0.736; mean = 4.74

Hoe ernstig denkt u dat de gevolgen van een overstroming voor uw woonomgeving zullen zijn?

Hoe ernstig denkt u dat de gevolgen van een overstroming voor u en uw gezin zullen zijn?

In hoeverre vertrouwt u er op dat het wel goed zal gaan met u en uw gezin in het geval van een overstroming? (reverse scale)

REWARDS - EXTRINSIC AND INTRINSIC

(6 items on a 11 point scale, 0 = Helemaal niet mee eens; 10 = Helemaal mee eens)

Cronbach's alpha = 0.915; mean = 5.42

EXTRINSIC REWARDS

Ik zou me gesteund voelen om zelf voorzorgsmaatregelen te treffen als sommige van mijn buren, vrienden of familie dat ook doen.

Ik zou extra voorzorgsmaatregelen tegen overstromingen willen treffen als dit door de maatschappij gewaardeerd wordt.

Ik zou extra voorzorgsmaatregelen tegen overstromingen willen treffen als ik daarvoor door de overheid beloond wordt (met subsidies, ontheffingen e.d.).

INTRINSIC REWARDS

In het algemeen voel ik me prettiger als ik zelf extra voorzorgsmaatregelen tegen overstromingen kan treffen.

Ik voel me prettiger als ik mijn burgerplicht vervul door zelf extra voorzorgsmaatregelen te treffen tegen overstromingen.

Ik voel me prettiger als ik weet dat ik door het treffen van extra voorzorgsmaatregelen tegen overstromingen bijdraag aan een veiligere toekomst voor mijn gezin en medeburgers.

SELF-EFFICACY

(8 items on a 11 point scale, 0 = Helemaal niet effectief; 10 = Heel effectief)

Cronbach's alpha = 0.869; mean = 5.53

In hoeverre vertrouwt u er op dat u zichzelf en uw bezittingen kunt beschermen tegen de gevolgen van overstromingen door de onderstaande voorzorgsmaatregelen te nemen?

(versie A)

o Kunnen zwemmen
o Het hebben van een (rubber)boot
o Het hebben van zandzakken of vloedschotten
o Het hebben van een noodpakket
o Het bewaren van waardevolle spullen op bovenverdiepingen
o Het hebben van een overstromingsalarmsysteem
o Vrijwilliger zijn bij evacuatieoefeningen
o Het direct opvolgen van een evacuatieoproep

(versie B)

o Kunnen zwemmen
o Het hebben van een dakraam of een dakkapel
o Het geregeld hebben van een tijdelijke verblijfsplaats
o Het hebben van zandzakken of vloedschotten
o Het hebben van een noodpakket
o Het hebben van een overstromingsalarmsysteem
o Dijkbewaker zijn

o Het direct opvolgen van een evacuatieoproep

RESPONSE EFFICACY

(8 items on a 11 point scale, 0 = Helemaal niet effectief; 10 = Heel effectief)

Cronbach's alpha = 0.849; mean = 5.91

Hoe effectief zijn volgens u de volgende voorzorgsmaatregelen in het beperken en eventueel voorkomen van de gevolgen van een overstroming voor uw persoonlijke bezittingen en uw leven?

- 8 maatregelen resp. Versie A en B (zie Self-Efficacy scale)

COSTS

(8 items on a 11 point scale, 0 = Helemaal niet effectief; 10 = Heel effectief)

Cronbach's alpha = 0.866; mean = 5.43

Het treffen van extra voorzorgsmaatregelen tegen overstromingen zal mij veel extra tijd kosten.

Het treffen van extra voorzorgsmaatregelen tegen overstromingen zal mij extra moeite kosten.

Het treffen van extra voorzorgsmaatregelen tegen overstromingen zal mij extra ongemak bezorgen.

Het treffen van extra voorzorgsmaatregelen tegen overstromingen zal mij veel extra geld kosten.

SUBJECTIVE KNOWLEDGE

(3 items on a 11 point scale, 0 = helemaal niet geïnformeerd / niet belangrijk / niet mee eens; 10 = heel goed geïnformeerd / heel erg belangrijk / helemaal mee eens) Cronbach's alpha = 0.530; mean = 5.66

Hoe goed denkt u dat u geïnformeerd bent over overstromingen en overstromingsgevaar?

In hoeverre vindt u de informatie en kennis over overstromingen die u hebt voor u persoonlijk van belang?

Ik wil heel graag meer te weten komen over het verband tussen het overstromingsgevaar en het nemen van voorzorgsmaatregelen ter bescherming tegen overstromingen.

TRUST IN GOVERNMENT

(4 items on a 11 point scale, 0 = helemaal niet mee eens / geen vertrouwen; 10 = helemaal mee eens / vol vertrouwen) Cronbach's alpha = 0.827; mean = 5.94

Ik denk dat de overheid mij informeert als de overstromingsrisico's in mijn woonplaats sterk veranderen.

In hoeverre vertrouwt u de overheid voor wat betreft bescherming tegen overstromingen in Nederland?

Denkt u dat de overheid het altijd goed heeft gedaan wat betreft bescherming tegen overstromingen in Nederland?

In hoeverre vertrouwt u de Nederlandse overheid in het algemeen?

Table 1A. Descriptive statistics of exogenous and endogenous variables used in PMT-TTM modelling

	PRECONTEMPLATIVE STAGE		CONTEMPLATIVE STAGE		ACTION STAGE		ENTIRE SAMPLE	
N respondents	743		491		177		**1411**	
	Mean	**Std.**	**Mean**	**Std.**	**Mean**	**Std.**	**Mean**	**Std.**
COMPOSITE INTENTION INDEX	*2.16	0.278	*2.56	0.364	*3.16	0.392	**2.43**	**0.468**
VULNERABILITY	**4.14	2.127	4.70	2.139	4.64	2.227	**4.40**	**2.159**
SEVERITY OWN	**4.60	1.764	4.87	1.818	5.00	1.892	**4.74**	**1.805**
BENEFITS	**5.13	1.873	5.71	1.725	5.85	1.592	**5.42**	**1.815**
SELF EFFICACY	**5.25	1.790	5.80	1.622	5.99	1.697	**5.53**	**1.748**
RESPONSE EFFICACY	**5.61	1.693	6.21	1.516	6.35	1.493	**5.91**	**1.640**
COSTS	5.47	1.930	5.43	1.923	5.29	1.741	**5.43**	**1.905**
SUBJECTIVE KNOWLEDGE	**5.35	1.537	5.94	1.503	6.16	1.540	**5.66**	**1.560**
TRUST IN GOVERNMENT	5.97	1.626	6.00	1.718	**5.61	1.767	**5.94**	**1.680**
OWN EXPERIENCE	**0.19	0.390	0.24	0.430	0.31	0.464	**0.22**	**0.416**

* significantly different at 1% level between all intention stages.

** significantly different from the other two intention stages at 5% level.

Table 2A. Results of regressions for PMT-TTM framework.

SHORT MODEL	whole sample (PMT)			ACTION			CONTEMPLATION			PRECONTEMPLATION		
	B	t-stat.		B	t-stat.		B	t-stat.		B	t-stat.	
(Constant)	2.033	36.200	*	2.867	17.690	*	2.219	27.018	*	2.082	47.345	*
VULNERABILITY (likelihood)	.018	2.769	*	.028	1.912	***	.004	.412		.009	1.666	***
SEVERITY	.011	1.497		.003	.147		.015	1.446		-.002	-.323	
BENEFITS	.006	.723		.061	2.757	*	.002	.203		-.030	-4.496	*
Self EFICACY	.019	1.590		-.001	-.019		.004	.285		.017	1.725	***
Response EFFICACY	.052	4.130	*	.003	.088		.048	2.803	*	.032	2.937	*
COSTS	-.034	-5.134	*	-.040	-2.442	**	-.015	-1.647		-.012	-2.269	**
R^2 / adjusted R^2	*0.089*	*/ 0.085*		*0.127*	*/ 0.096*		*0.059*	*/ 0.047*		*0.070*	*/ 0.062*	
df model / residual	*6*	*/ 1403*		*6*	*/ 170*		*6*	*/ 483*		*6*	*/ 736*	
EXTENDED MODEL	**whole sample (PMT)**			**ACTION**			**CONTEMPLATION**			**PRECONTEMPLATION**		
	B	t-stat.		B	t-stat.		B	t-stat.		B	t-stat.	
(Constant)	1.991	26.154	*	3.031	14.825	*	2.097	18.771	*	2.002	32.691	*
VULNERABILITY (likelihood)	.012	1.785	***	.017	1.147		.001	.131		.014	2.462	**
SEVERITY	.005	.640		-.013	-.713		.019	1.680	***	-.002	-.283	
BENEFITS	-.006	-.748		.050	2.201	**	-.004	-.347		-.031	-4.472	*
Self EFICACY	.018	1.545		-.014	-.515		.002	.146		.018	1.764	***
Response EFFICACY	.052	4.183	*	.019	.640		.046	2.683	*	.031	2.842	*
COSTS	-.034	-5.139	*	-.037	-2.252	**	-.017	-1.908	***	-.010	-1.795	***
Subjective KNOWLEGDE	.043	4.865	*	.039	1.790	***	.029	2.334	**	-.008	-1.103	
TRUST in government	-.018	-2.451	**	-.042	-2.332	**	.000	-.046		.011	1.663	***
Own EXPERIENCE	.087	2.989	*	.046	.668		.002	.040		.009	.337	
dummy EILAND VAN DORDRECHT (dijkring 22)	-.028	-.806		-.057	-.647		.015	.315		-.020	-.685	
dummy LAND VAN HEUSDEN / DE MAASKANT (dijkring 36)	.037	1.104		-.083	-1.018		.074	1.537		.063	2.271	**
dummy ZEELAND (dijkringen 28, 29, 30)	.029	.885		.009	.107		.002	.053		.072	2.581	*
R2 / adjusted R2	*0.118*	*/ 0.110*		*0.195*	*/ 0.136*		*0.075*	*/ 0.052*		*0.091*	*/ 0.076*	
df model / residual	*12*	*/ 1397*		*12*	*/ 164*		*12*	*/ 477*		*12*	*/ 730*	

*, **, *** - statistically significant at 1%, 5% or 10% level, respectively.