Protection Motivation Theory (PMT) & Links to DCU Based Research

Dr Caroline McMullan
Origins & Basis of PMT

• Protection motivation theory founded by Rogers (1975) – based on expectancy-value theory
• Originally to better understand “fear appeals”.
• “Fear Appeals” are “Communications that attempt to change our attitudes by appealing to that unpleasant emotion of fear” (Rogers, 1983, p153)
• PMT was extended by Rogers (1983) to a more general theory of persuasive communication by adding reward & self efficacy components

• Protection motivation stems from both the threat appraisal and the coping appraisal.

• Protection Motivation Theory suggests that individuals protect themselves based on 4 factors:
  1. the perceived probability of the occurrence
  2. the perceived severity of a threatening event
  3. the efficacy of the recommended preventive behaviour
  4. perceived self efficacy  Sometimes a 5th is added
  5. response cost
Protection Motivation & Action

• These cognitive processes “mediate the effects of the components of fear appeals on attitudes by arousing what has been termed “protection motivation”. (Rogers, 1983, p158)

• “The intent to adopt the communicator’s recommendation is a function of the amount of protection motivation aroused.” (Rogers, 1983, p158)
A Schema of PMT\(^{(Poong, 2016)}\)

- **Components of a fear appeal**
  - Magnitude of noxiousness
  - Probability of occurrence
  - Efficacy of recommended response

- **Cognitive mediating processes**
  - Appraised severity
  - Expectancy of exposure
  - Belief in efficacy of coping response

- **Attitude change**
  - Protection motivation
  - Intent to adopt recommended response
Threat Appraisal - perceived probability of the occurrence

- Sometimes term perceived vulnerability is used
- Refers to perceived expectation of being exposed to a particular threat/risk
- Akin to likelihood when completing a risk assessment
Threat Appraisal - perceived severity of a threatening event

• Also referred to as magnitude of noxiousness
• Estimate of how harmful the consequences of exposure will be
• Akin to Impact when completing a risk assessment
Coping Appraisal

• Takes place only after a threat appraisal has been undertaken
• An individual will only complete a coping appraisal once a certain threshold of threat appraisal has been reached
• "a minimum level of threat or concern must exist before people start contemplating the benefits of possible actions and ruminate their competence to actually perform them" (Schwarzer, 1992. In: Grothmann & Reusswig, 2006, pp105-6)
Efficacy of the Preventive Action & Perceived Self Efficacy

- Coping Appraisal has 3 components:
  1. A belief that the recommended action will be effective – will protect against harm (efficacy of the recommended preventive behaviour)
  2. A belief that the individual can actually perform or complete the recommended action(s) – (perceived self efficacy)
  3. Perceived cost of the recommended action
Basically...

• “any source of information about a threat… initiates a threat appraisal process and a coping appraisal process”. (Rogers, 1983, p173)
• Widely used theory in preventive health.
• Examples include anti smoking campaigns, diabetes, campaigns centred on limiting alcohol consumption.
• Based on the idea that disease prevention campaigns are more effective when negative appeals are utilised.
• “studies of fear-arousing communications published between 1953 and 1980 showed that increases in the perceived level of fear consistently resulted in increases in acceptance of the proposed adaptive behaviour or intention. Also, increments in perceived response efficacy increased the intentions to select the adaptive response.” (Floyd, Prentice-Dunn & Rogers, 2000, p.409)
Move from Health to Emergency Management
Studies in Areas Such As:

Flooding
- Risk Perception & Flood Mitigation Behaviour
- People at Risk of Flooding – why some take action and some do not (Cologne, Germany)
- Perception & Communication of Flood Risk
- Factors influencing flood damage mitigation
- Flooding Experiences in the Netherlands

Wildland Fires
- What motivates people to protect themselves against wildland fires

Earthquake Preparedness
- Earthquake preparedness in the USA
Factors Which May* Influence Protection Motivation Action

- Age
- Gender
- Marital Status
- Education
- Proximity to Risk (e.g., close to river, volcano)
- Rural/Urban divide
- Household Income
- Household Ownership
- Previous Experience of Emergency
- Worry or Dread of specific Emergency

* conflicting evidence from different studies
Factors Which May* Decrease PM Action

- Denial
- Wishful Thinking
- Fatalism
- Lack of Knowledge
- Financial Constraints
- Reliance on Public Mitigation (such as flood defences)

* conflicting evidence from different studies
In An Irish Context
Risk Perception & Emergency Preparedness in Ireland: Gender Differences

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Dr Ann Largey
Dr Caroline McMullan,
DCU Business School
Studies of Risk Perception

“examine the judgements people make when they are asked to characterize and evaluate hazardous activities and technologies.” (Slovic, 1987, p.280)

In this case risk perception in relation to 17 risks which could impact on individuals and/or their homes.
Literature Review – Gender & Risk

• Risks tend to be judged as lower by men than by women (see, for example, Brody, 1984; Gutteling and Wiegman, 1993; Stem et al. 1993; Flynn et al, 1994).

• "Men and women …seem to worry about the same risks, but women constantly worry a bit more…The differences are seldom very large, but systematic.” (Gustafson, 1998, p.806)
Literature Review – Gender & Risk

• Women tended to have higher disaster expectations, more worry, and higher loss estimations.

• Furthermore, household property and being married were related to threat perceptions, showing that the more individuals have at stake the more threat they perceive. (Karanci et al, 2005, p.255)
In a similar US Study…

• By Flynn et al (1994), 1,512 Americans were asked to rate 25 risks & indicate whether the risk posed: (1) little or no; (2) slight; (3) moderate; or (4) high risk to society.

• Results showed that the percentage of high-risk responses was greater for women than men on every item.
Preparedness & Gender

• Males think that they have a greater ability to protect themselves from the effects of a volcano and rate their level of self preparedness as significantly higher than females. (Barberi et al, 2008)
Some Conflicting Studies

• Gender was a significant predictor for technological hazards, but not for non-technological hazards. (Siegrist et al, 2005)

• Tekeli-Yeşil et al (2010) also found that gender did not show a significant association in the final model.
Demographics

• Data gathered via questionnaire
• 1584 Usable Responses Received
• Male 49% (n=776)
• Female 51% (n=808)

Note 25.9% (n=553) did not declare gender
Analysis

Aim:
Estimate the impact of being female on
(i) Perceived likelihood
(ii) Perceived impact and
(iii) Overall risk assessment

controlling for other socioeconomic factors
(age, income, children, household size, rural location, renter, length of occupation)
Analysis

• Perceived Likelihood and Perceived Impact
  • Likert scale (1 to 5)
  • Ordered Probit

• Overall Risk Rating
  – Treated as continuous variable (1 to 25)
  – OLS regression
## Natural Risks (impact of female)

<table>
<thead>
<tr>
<th>Event</th>
<th>Likelihood</th>
<th>Impact</th>
<th>Overall risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flooding</td>
<td>0.247***</td>
<td>0.0001</td>
<td>0.643**</td>
</tr>
<tr>
<td>Drought</td>
<td>0.206***</td>
<td>0.053</td>
<td>0.749**</td>
</tr>
<tr>
<td>Severe Snow</td>
<td>0.091</td>
<td>0.127**</td>
<td>0.628**</td>
</tr>
<tr>
<td>Storm</td>
<td>0.163**</td>
<td>0.174***</td>
<td>0.970***</td>
</tr>
<tr>
<td>High Temperature</td>
<td>0.069</td>
<td>0.079</td>
<td>0.439*</td>
</tr>
<tr>
<td>Low Temperature</td>
<td>0.110*</td>
<td>0.194***</td>
<td>0.849***</td>
</tr>
</tbody>
</table>
## Technological Risks (impact of female)

<table>
<thead>
<tr>
<th></th>
<th>Likelihood</th>
<th>Impact</th>
<th>Overall risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire</td>
<td>0.145**</td>
<td>-0.089</td>
<td>0.245</td>
</tr>
<tr>
<td>Disruption to Energy</td>
<td>0.199***</td>
<td>0.214***</td>
<td>1.338***</td>
</tr>
<tr>
<td>Nuclear (Abroad)</td>
<td>0.187***</td>
<td>0.102*</td>
<td>1.089***</td>
</tr>
<tr>
<td>Radiation (Domestic)</td>
<td>0.304***</td>
<td>0.164***</td>
<td>1.596***</td>
</tr>
<tr>
<td>Cyber incident</td>
<td>0.069</td>
<td>0.139**</td>
<td>0.557*</td>
</tr>
</tbody>
</table>
## Civil Risks (Impact of female)

<table>
<thead>
<tr>
<th>Risk</th>
<th>Likelihood</th>
<th>Impact</th>
<th>Overall risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of Critical Infrastructure</td>
<td>0.152***</td>
<td>0.240***</td>
<td>1.281***</td>
</tr>
<tr>
<td>Infectious Disease (humans)</td>
<td>0.137**</td>
<td>0.034</td>
<td>0.737**</td>
</tr>
<tr>
<td>Infectious Disease (livestock)</td>
<td>0.051</td>
<td>0.1</td>
<td>0.646**</td>
</tr>
<tr>
<td>Water borne disease outbreak</td>
<td>0.183***</td>
<td>0.146**</td>
<td>1.041***</td>
</tr>
<tr>
<td>Food borne disease outbreak</td>
<td>0.167***</td>
<td>0.095</td>
<td>0.852***</td>
</tr>
<tr>
<td>Terrorism</td>
<td>0.222***</td>
<td>0.144**</td>
<td>1.241***</td>
</tr>
</tbody>
</table>
Marginal Impact of Female on Perceived Likelihood of Flooding

i.e. What is the difference in the probability a female will state each risk category compared to a man, assuming the same values for all other variables?

<table>
<thead>
<tr>
<th>Extremely Unlikely</th>
<th>Very Unlikely</th>
<th>Unlikely</th>
<th>Likely</th>
<th>Very Likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.082</td>
<td>-0.017</td>
<td>0.039</td>
<td>0.044</td>
<td>0.016</td>
</tr>
<tr>
<td>-8%</td>
<td>-2%</td>
<td>+4%</td>
<td>+4%</td>
<td>+2%</td>
</tr>
</tbody>
</table>
Perceived Preparedness - Analysis

Aim: Estimate the impact of being female on
(i) Perceived preparedness
(ii) Action to protect

controlling for other socioeconomic factors
(age, income, children, household size, rural location, homeowner/renter, length of occupation)
Coefficients and significance of ‘Female’

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Coefficient (significance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparedness</td>
<td>-0.475 ***</td>
</tr>
<tr>
<td>Action to protect</td>
<td>-0.145*</td>
</tr>
</tbody>
</table>
Marginal impact of ‘Female’

<table>
<thead>
<tr>
<th>Effect of ‘female’ on probability of perceived preparedness</th>
<th>No</th>
<th>Somewhat</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.132</td>
<td>-0.024</td>
<td>-0.107</td>
<td></td>
</tr>
<tr>
<td>13%</td>
<td>-2%</td>
<td>-11%</td>
<td></td>
</tr>
</tbody>
</table>

Effect of ‘female’ on probability of having taken action to protect = - 6%
### Reason for Lack of Action

<table>
<thead>
<tr>
<th>Reason</th>
<th>Male (n=320)</th>
<th>Female (n=389)</th>
<th>Total (n=709)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don’t know what to do (*** )</td>
<td>105 (31%)</td>
<td>180 (46%)</td>
<td>285</td>
</tr>
<tr>
<td>Haven’t had time</td>
<td>60 (19%)</td>
<td>57 (15%)</td>
<td>117</td>
</tr>
<tr>
<td>Don’t want to think</td>
<td>62 (19%)</td>
<td>60 (15%)</td>
<td>122</td>
</tr>
<tr>
<td>Expense</td>
<td>84 (26%)</td>
<td>90 (23%)</td>
<td>174</td>
</tr>
<tr>
<td>Won’t make a difference (*** )</td>
<td>78 (24%)</td>
<td>65 (17%)</td>
<td>143</td>
</tr>
<tr>
<td>Emergency services will help</td>
<td>69 (22%)</td>
<td>98 (25%)</td>
<td>167</td>
</tr>
</tbody>
</table>

NB: % refers to the percentage of males (females) who indicated the reason applied to him (her).
Males Risk Perception Matrix

Mode

Very Low

LIKELIHOOD

Very Likely

IMPACT

Extremely Unlikely

A: Flooding
B: Drought
C: Snow
D: Storm
E: Storm
F: High Temp.
G: Low Temp.

Very Low

A, Y, Z

F

Very High

E, G, T, X

M, N, Q, R

V, W

Q: Water Borne Outbreak
M: Loss Critical Infrastructure
N: Infectious Disease
O: Animal Disease
R: Food Borne Outbreak
T: Disruption to Energy Supply
V: Fire
W: Nuclear (Abroad)
X: Cyber Incident
Y: Radiation (Domestic)
Z: Terrorist Activity
Females Risk Perception Matrix

Mode

Very Low Likelihood

Very Likely

Extremely Unlikely

Very Low Impact

IMPACT

Very High

A: Flooding 
F: High Temp.
B: Drought 
G: Low Temp.
C: Snow 
Q: Water Borne Outbreak
M: Loss Critical Infrastructure 
R: Food Borne Outbreak
N: Infectious Disease 
T: Disruption to Energy Supply
O: Animal Disease 
Y: Radiation (Domestic)
T: Disruption to Energy Supply 
Z: Terrorist Activity
Conclusions

- Gender significantly influences the perceived likelihood, impact and/or overall risk assessment of each of the 17 risks.
- Unlike the Siegrist et al (2005) study, our results indicate that gender is a significant predictor for technological hazards AND for non-technological hazards.
Conclusions

Women are:

(i) more likely to perceive a risk,
(ii) less likely to feel prepared and
(iii) less likely to have taken action to protect themselves and/or their home.
Conclusions

• Our results support the finding: "Men and women …seem to worry about the same risks, but women constantly worry a bit more…The differences are seldom very large, but systematic.” (Gustafson, 1998, p.806)
Citation

• If citing the results of this survey/presentation, please use the following format:

Gender References


Gender References


2017 Irish Study - Interim Results
Have you taken any action to protect yourself or your home in case of an emergency?

<table>
<thead>
<tr>
<th>#</th>
<th>Answer</th>
<th>%</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>58.19%</td>
<td>2945</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>41.81%</td>
<td>2116</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100%</td>
<td>5061</td>
</tr>
</tbody>
</table>

(Source: Brown, McMullan, Largey, 2017, DCU)
Why have you not taken action to protect yourself or your home in case of an emergency? (Source: Brown, McMullan, Largey, 2017, DCU)
References

• Poong, Y.S. 2016. Study of Perceptions on Behavioral Expectation to Preserve World Heritage Site through Mobile Learning Application in Luang Prabang, Lao PDR. Available at: https://www.researchgate.net/publication/299330900_Stud of_Pe rceptions_on_Behavioral_Expectation_to_Preserve_World_Heritage_Site_through_Mobile_Learning_Application_in_Luang_Prabang_Lao_PDR/figures?lo=1