Dead Poet Anxiety: Investigating the relationship between worry and flood mitigating behaviors

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Abstract

Candidate 10015: Dead Poet Anxiety: Investigating the relationship between worry and flood mitigating behaviors

Under the direction of Amanda Elizabeth Lay

The present study aims to investigate the relationship between the individuals' degree of worry and their protective behaviors, for people living in Norway. A structured survey was sent throughout the country, and 296 people responded. Participants were asked if they have adopted specific behaviors that would prevent the negative consequences of floods. Degree of worry was measured by the means of an item-set, which was validated and developed by Wilson, Zwickle & Walpole (2018). The items asked the participants to estimate their feelings of worry, in relation to climate change. Furthermore, the survey also asked the participants to appraise their perceived likelihood of a flood occurring, as well as their personal capacity to cope with floods (coping appraisal). The participants' socio-demographic characteristics were also gathered. It was hypothesized that degree of worry would promote protective behavior better than perceived likelihood of a flood, and that coping appraisal would moderate the relationship between the variables regarding degree of worry and protective behaviors. Results displayed that participants slightly favor the use of protective behavior. Contrary to existing litteratur, correlational and regression analyses suggested that protective behavior and degree of worry had a negative association. The findings surrounding the participants' coping appraisals were not significant. Empirical and theoretical indications of the findings are discussed.

PREFACE

The framework of this study was conducted in the Department of psychology of the Norwegian University of Science and Technology (NTNU). The research presented is a part of an empirical research project led by Amanda E. Lai. The research project, named “What does it take to invest in protective actions?”, is a part of the bachelor thesis program, termed PSY2900, In Depth Research in Psychology. The project focuses on investigating factors that may lead to protective behaviors, with reference to floods. The hypotheses in the study were inspired by former research on risk perception to natural hazards. Through research and discussions, the thesis and hypotheses were created by myself and a fellow student I cooperated with throughout the semester. The studys choice of method for the statistical analyses, was based on recommendations from my supervisor. All the analyses were performed by myself.

I wish to thankfully acknowledge my supervisor Amanda E. Lai for her assistance and encouragement. I would also like to thank fellow students in the bachelor-program for enriching discussions, as well as Robin Williams for an inspiring performance in Dead Poet Society.

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1. Introduction

It is widely accepted that natural hazards occur more and more often due to climate change. In Europe, the most frequent and damaging weather-related disasters are floods and storms. Traditionally, this has been tackled by the use of protective measures which aims to reduce the potential damage by floods (Bubeck, et al., 2012). However, as mentioned, these floods occur more and more often, and therefore, the understanding of individuals' motivational aspects of protective behavior in regard to climate change, has become a key issue among researchers, policymakers, politicians, etc (Cismaru, et al., 2011). In fact, the investigation of motivational processes can help risk communicators such as politicians improve their communication in regards to climate change, which may assist in motivating humans to change their behaviors to more protective ones. This is important since former studies have indicated that most people are not aware or uncertain about the severe consequences of climate change. For example, after Maibach, Roser-Renouf, and Leiserowitz published a study on the American population in 2009, they discovered that almost 50% of them were not convinced about the severity of climate change, and would therefore not adopt protective behaviors that could help mitigate the damages deriving from climate change. Similarly, Lorenzoni, et al. (2007) discovered that the UK public has a lack of knowledge, and doesn't trust their information sources in regards to climate change. Most of them believed that climate change is a distant threat, and as a result, had no intentions of changing their lifestyle to prohibit damages that may come as a result of climate change. However, as a result of these misconceptions about climate change, the protection motivation theory (PMT) has widely been used by researchers in many fields, eg. in environmental psychology to gain a better understanding of why people do not recognize the severe damages of climate change. The PMT offers a theoretical framework that explains why high-risk perceptions may not necessarily lead to mitigating behaviors (Bubeck, et al., 2012). As well as being widely accepted, the theoretical framework has frequently been used to understand what guides behavioral change for communication campaigns (Cismaru, et al., 2011).

With this in mind, many studies have in recent years used the benefits of the protection motivation theory (PMT) when studying people's risk perception in relation to climate change, due to its impressive explanatory power (Bubeck, et al., 2017). PMT, like other social-cognitive theories, is an expectancy-value theory (Bamberg, et al., 2017). It states that if individuals are presented with a clear and obvious threat, while also being provided with

recommendations that would help avoid or mitigate the given threat, they would utilize the behavior that is recommended, if it is perceived as feasible (Cismaru, et al., 2011).

The protection motivation theory centers around five elemental constructs; i) *threat vulnerability* which encapsulates the actors perceived likelihood of exposure to the given threat, ii) *threat severity* which applies to the actors' perceived consequences of the given threat, iii) *response efficacy* which addresses the actors perceived effectiveness to the protective behavior of the given threat, iv) *self-efficacy* which includes the actors' perceived capability to perform the protective behavior to the given threat, and *responsive cost* which refers to the cost of implementing the certain protective behavior to the given threat. Note that the latter also reflects the emotional effort and time needed to implement the necessary measure, not only the financial cost (Bubeck, et al., 2017). Here, the first two terms, threat vulnerability and threat severity are subcomponents of what the PMT refers to as *threat appraisal*, and the other three terms, response efficacy, self-efficacy and responsive cost belong to the parent category of *coping appraisal* (Bamberg, et al., 2017). See Figure 1 below. However, there is no universal agreement when it comes to the name of these terms, as they are referred to by different names by researchers in many studies. There have been numerous studies, including two meta-analytical, that have examined each of these variables in the PMT on persuasion measures, for instance, the actor's intention to adopt these recommended behaviors (Cismaru, et al., 2011). They have indicated that higher levels of the perceived threat appraisal and self-efficacy, will increase the likelihood to adopt the protective behavior that is recommended (Milne, et al., 2000). In other words, high threat appraisals and high coping appraisals, may lead to the adaptation of protective behavior. More specifically, when comparing the two components, coping appraisal has the better predictive validity than threat appraisal (Bubeck, 2017). For example, when studying how much additional variance the components could explain in relation to predictive behavior, Grothmann and Reusswig (2006) found that threat appraisal could explain three to six percent, while coping appraisal could explain two to twenty-one percent.

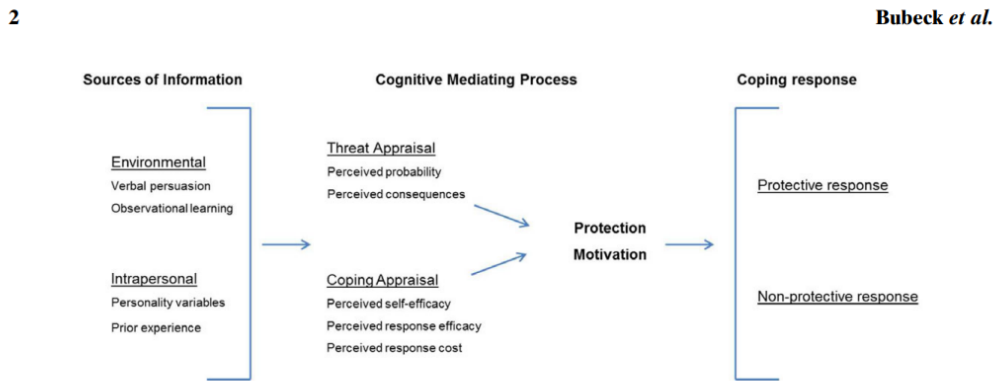

Fig. 1. A schematic overview of the protection motivation theory (adapted from Bubeck, et al., 2017)

As Miceli, et al. pointed out in 2008, former results regarding a correlation between disaster preparedness and risk perception have suggested that the link between these two variables is weak or non-existent. For example, in 2006, following a survey that was sent through the mail to a sample of adults living in Switzerland, Siegrist and Gutscher (2006) revealed that protective behaviors to cope with floods were not influenced by either perceived risk nor protective risk. Furthermore, according to Miceli, et al. (2008), Lindell and Whitney (2000) did not find any significant correlation between the adoption of seismic hazard adjustments and perception of earthquake risk among a sample of university students living in earthquake-prone areas in California. How is it then, that two variables that one would reason should correlate with each other (e.g. “I don’t like this problem, I should fix it”), do not? In order to answer this, one must look at the operational definitions of risk perception used in former studies on risk perception concerning climate change (Miceli, et al., 2008). For instance, almost all former measures on risk perception refer to a rationalist view of the construct of risk perception, as does the PMT when predicting protective measures (Bamberg, et al., 2017; Miceli, et al., 2008). However, by following this view, one can define risk perception as the actor's cognitive and subjective evaluation of the likelihood that there will occur a flood in the future that will damage his/her belongings. Moreover, one could argue that such definitions limit the degree how people perceive environmental risk since such evaluations are likely to include more than an estimation of the likelihood of a risk and the personal and material damages that derive from it. To illustrate this, theoretical models that suggest that risk perception could be correctly conceptualized as a complex process that encompasses the aspects of affect and the cognitive, have been proposed in both emotional psychology and cognitive psychology (Miceli, et al., 2008). For this reason, it is reasonable to

assume that researching the emotional aspect of protective behavior may also play an important role when predicting protective behavior.

Results from studies such as Ogunbode et al. (2018) and Böhm (2003) indicated that emotions play a very important role when predicting protective behavior. However, as mentioned above, most studies seem to examine the emotional aspect and the cognitive aspect as one variable in risk perception, instead of differentiating the two components. Ogunbode et al. (2018) study suggested that emotions and personal capacity to cope with floods (coping appraisal) can have a sort of paradoxical effect, in which they can both promote and prohibit protective behavior. One could therefore argue that separating these variables (affect and the cognitive evaluation of risk perception) may prove to be an essential contribution to the study of risk perception. More specifically the actors' degree of worry, as this emotional component has not been studied a lot before, although it is one of the most powerful predictors when it comes to human behavior (Böhm, 2003). Furthermore, as mentioned, coping appraisal can explain two, to twenty one percent of additional variance to protective behavior Grothmann and Reusswig (2006). These varying differences are quite substantial, and one could therefore argue that Coping Appraisal may have a moderating effect on other variables, including the relationship between protective behaviors and degree of worry.

2. The present study: Aims and hypotheses

The premise of this study was to examine if the actor's degree of worry will affect his/her risk perception, with the research question being; *what effect does the degree of worry have on individuals' intentions to adapt protective behavior*? The study will test the validity of the protection motivation theory by adding "affect" as a separate variable from the rational cognitive appraisals, which will be identified with the variable "Likelihood of exposure to floods" as they may have separate correlations with behavioral intentions. The present study is based on data collected from a survey questionnaire and was sent throughout Norway; both risk-prone and non-risk-prone areas. To measure the individual's coping appraisal, degree of worry, likelihood of exposure to floods, and willingness to invest in protective behavior, several questions were gathered from the following studies: Richert, Erdlenbruch & Figuieres, (2017); Wilson, Zwickle & Walpole, (2018); Seebauer & Babcicky, (2018).

Moreover, the cognitive components regarding coping appraisal were measured through subjective judgments concerning the potential event of a future flood. By contrast, the affective components were investigated by asking the participants to report their estimated feelings of worry about a future flood.

2.1. Hypotheses

H_1: Degree of worry promote protective behavior better than cognitive probability measures.

H_2: Degree of worry and protective behavior have a positive correlation.

H_3: Coping appraisal will moderate the relationship between worry and protective behaviors

- Prediction: When coping appraisal is high, the correlation between worry and protective behaviors will increase, and vice versa.

3. Method

3.1. Sample

The participants were recruited through a snowball sample. The sample contains 296 respondents, and was stratified into age and gender. Approximately 55% of the participants were women (n=163), 43% were men (n=126), and 2.4% of the participants were either non-binary or preferred not to say (n=7). To conduct the study accordingly, the latter was treated as missing values. As regards to the participants' age, it ranged from 18 years to 79 years (M=27.51, S.D.=16.5).

3.2. Procedure

The study conducted a cross-sectional self-completion survey all across Norway, at the beginning of April 2022. As mentioned, the study's data was collected through a snowball sample, where my colleagues sent out the survey to friends and family members, who then sent it on to their acquaintances. Furthermore, participants were also recruited by the use of social media, where we sent the survey out to Facebook pages for risk-prone areas, in hope that the residents of these areas would respond. This way, it would be easier to have a more diversified list of respondents. The survey took approximately fifteen minutes to complete, and the participants were not given any information prior to taking the test. Before sending out the survey, it was accepted by NTNU and NSD (link in appendix)

3.3. Measurement

As formerly mentioned, the survey was designed to identify what, if any, effect the actors' degree of worry had on one's protective motivation against floods, concerning climate change. The study also included some control variables regarding the demographic of the participants and their coping appraisals to the floods. Apart from the demographic variables, all of the items that were used for this study consisted of a five-point likert scale that ranged from 1=*Very unlikely* to 5=*Very likely*, 1=*Not at all* to 5=*Extremely*, and 1=*strongly disagree* to 5=*Strongly agree*. To measure these variables, it was necessary to compute the variables into one single construct per superior variable. In other words, the survey's answers regarding individuals mitigating behaviors, which consisted of seven items, were treated collectively as a single construct by combining their mean. The study would become more reliable, since multiple response measures are generally more reliable than single response measures. On the other hand, this is only necessary if the individual variables correlate with each other, otherwise, this new superior variable would not be reliable. Therefore, we computed an internal consistency measure by applying a factor analysis.

3.3.1. Outcome variable

Willingness to invest in protective behavior

To measure the participants' adaptation to protective behaviors, we gathered specific items from existing literature, specifically Richert, Erdlenbruch & Figuieres (2017). The set was made up of seven items that invited participants to indicate how likely they were to implement a variety of protective measures. As mentioned, response alternatives ranged from 1=*Very unlikely* to 5=*Very likely*. The items were translated to Norwegian, then back-translated to English, before finally translated back to Norwegian. They are listed in Table 1 as they were presented to the participants. However, in order to measure these variables, it was necessary to compute the variables into one single construct per superior variable. In other words, the survey's answers regarding individuals mitigating behaviors, which consisted of seven items, were treated collectively as a single construct by combining their mean. The study would become more reliable since multiple response measures are generally more reliable than single response measures. On the other hand, this is only about the individual variables that correlate with each other, otherwise, this new superior variable would not be reliable. Therefore, we computed an internal consistency measure by applying a factor analysis.

Table 1. *Willingness to invest in protective behavior*

1. I intend to move valuable items on an upper level in the house
2. I intend to prepare my home for floods
3. I intend to prepare an emergency plan for all my household members
4. I intend to purchase private flood insurance
5. I am willing to consider re-location
6. I am willing to coordinate with neighbors (e.g., joint emergency plan, joint structural measures)
7. I am interested in receiving more information about flood danger in my local environment

3.3.2. Predictor variables

3.3.2.1. Degree of worry

The items used to quantify the participants' degree of worry in relation to floods, were assembled from Wilson, Zwickle & Walpole, (2018). In their study, the set contained eight items that were used to investigate the participants' flood risk perception. However, since this is not the aim of the study, we chose three specific items from the set that identified the participants' emotional perceptions of future floods. This would enable us to identify the participants' affective components, in order to separate them from their probability measures. The items used for our survey are listed in Table 2 as they were presented to the participants.

Table 2. *Degree of worry*

1. When you think about floods for a moment, to what extent do you feel worried?
2. When you think about floods for a moment, to what extent do you feel anxious?
3. When you think about floods for a moment, to what extent do you feel fearful?

3.3.2.2. Coping Appraisal

Whereas the items used to measure the former variables was gathered from one specific source for each variable, the items used to measure the participants' coping appraisal was gathered from two distinct sources, specifically Richert, Erdlenbruch & Figuieres, (2017) and Crossler, (2010). As Table 3 shows, the set contains three items, where the first to were gathered from Richert, Erdlenbruch & Figuieres, (2017), and the last one was assembled from Crossler, (2010). The set contained three items, they were meant to interpret the participants' response efficacy and self-efficacy. However, it should be noted that the last item from the set has been edited for it to structure more accordingly for the case of floods. Furthermore, it was necessary to compute a moderated multiple regression analysis, since this variable was added to see if it moderates the relationship between the degree of worry and protective behaviors. However, the optimal way to perform such an analysis requires an extension to SPSS, and there were some difficulties acquiring this. The analysis was still conducted, but since the extension could not be added to SPSS, the results only show if the variable “coping

appraisal" moderates the relationship between the participants' degree of worry and their protective behavior. The conditional effects of the focal predictor "degree of worry" and its moderator "coping appraisal", could not be produced. The items used for our survey are listed in Table 3 as they were presented to the participants.

Table 3. *Coping appraisal*

1. I think I am able to avoid the consequences from flood in my household
2. I have control over behaviors that is protective against floods
3. I believe the likelihood of experiencing negative consequences from floods, mitigates through protective behavior

3.3.2.3. Likelihood of exposure to flood

To measure the participants' cognitive probability measures, the survey only used one item, where the participants were asked "*how likely is it that a flood will arise where you live*?". The reason behind the lack of items surrounding the measurement of this scale is the specific nature of the question. I concluded that asking the participants more similar questions regarding this subject, would as a whole cause confusion among the participants. In other words, I felt that the item which was used was specific enough to gather the necessary data to accurately complete this study.

3.3.2.4 Sociodemographic characteristics

The survey asked the participants seven socio-demographic questions, but only four of them were used for this study ("level of education", "age", "gender" and if they lived in a flood exposed area). All of these variables were obtained at the end of the survey. The variables regarding the participants' gender and if they lived in a flood exposed area were codified as dichotomous: gender (male=1, female=0), do you live in a flood exposed area (yes=1, no=0). The level of education was measured using a five-point likert scale, that ranged from 1=middle school to 5=exam of a higher degree, whereas the participants' age was measured by simply asking them to fill in their age. The ages ranged from 18 to 79 years.

3.4. Design

To uncover if the degree of worry would have affected the actors' protective behaviors, the study conducted a correlational research design, which will produce insights into the relationship between the variables representing these individual components. Variables representing cognitive evaluation of risk, coping appraisal, and the socio-demographic characteristics were also added.

3.5. Statistical analysis

The statistical analysis was conducted as follows: For an overview of the data, a descriptive analysis of protective behaviors (PB) and degree of worry (DW) was performed. Further, the correlation coefficients between PB, DW, likelihood of exposure to flood (LOF) coping appraisal (CA), and the socio-demographic features were explored, through a correlation analysis. Finally, we utilized IBM SPSS Statistics 27, to conduct a multivariate analysis, more specifically a multiple regression analysis, to analyze how an adaptation of protective behaviors could be related to the degree of worry. Multiple regression analysis would enable us to look for possible correlation between these two variables, as well as be able to directly compare the individuals affect and cognitive reasoning (coping appraisal) as to what plays the larger role in predicting the adaptation of protective behavior, while also controlling the socio-demographic characteristics. A factor analysis was also conducted to examine the validity of the questions regarding all the variables that were within a set. The frequency of missing variables was non-existent, except for the variable “Gender”.

4. Results

Table 4

Descriptive statistics. Response Means and Standard Deviations

	N	Mean	Std. Deviation
Protective behavior	296	3.37	0.85
Coping appraisal	296	1.94	0.82
Degree of worry	296	2.84	0.8
Likelihood of exposure to floods	296	2.14	1.07
Level of education	296	3.75	1.2
Age	296	44.62	16.7
Gender	289	0.56	0.5
Do you live in a flood exposed area?	296	0.34	0.47

The descriptive statistics of each variable are reported in table 4. The mean responses of the participants can be found around the middle of the answering options (?). Table 5 shows the correlations between the variables used for the study. Most of the correlations displayed were weak. As table 5 presents, CA and PB have a significant (p= 0.045), but weak correlation (r=0.12). However, the correlation between DW and PB was moderate (r=-0.36) and highly significant (p>0.00). Younger participants scored higher on PB than the older participants as the correlation was r=0.3, with a p-value of 0.03, which indicates a significant correlation. The correlation analysis indicates that males are slightly more prone to adapt protective behaviors, compared to females (r=-0.14), as there was a highly significant correlation between these variables (p=0.016). The participants' level of education, on the other hand, had a very weak correlation with PB (r=-0.01), but the *p-value* was not significant (p=0.82). The variable representing whether the individuals live in a flood exposed area, had a positive correlation with PB (r=-0.18) and is very significant (p>0.00).

Table 5

Correlations between the studied variables

Variable	1	2	3	4	5	6	7	8
Protective Behavior	- (N=296)	0.12 *p*=0.045 (N=296)	-0.36 *p>0.00* (N=296)	-0.18 *p*=0.002 (N=296)	-0.29 *p*=0.027 (N=296)	-0.14 *p*=0.016 (N=289)	-0.01 *p*=0.82 (N=296)	-0.18 *p*=0.001 (N=296)
Coping Appraisal	-	- (N=296)	-0.13 *p*=0.024 (N=296)	0.02 *p*=0.77 (N=296)	-0.27 *p*=0.03 (N=296)	-0.11 *p*=0.054 (N=289)	-0.04 *p*=0.43 (N=296)	0.64 *p*=0.14 (N=296)
Degree of Worry			- (N=296)	0.32 *p*>0.00 (N=296)	0.07 *p*=0.07 (N=296)	0.1 *p*=0.1 (N=289)	-0.04 *p*=0.54 (N=296)	0.24 *p*>0.00 (N=296)
Likelihood of exposure to flood				- (N=296)	0.03 *p*=0.64 (N=296)	-0.002 *p*=0.97 (N=296)	-0.02 *p*=0.74 (N=296)	0.44 *p*>0.00 (N=296)
Age					- (N=296)	0.02 *p*=0.74 (N=289)	0.13 Sig=0.02 (N=296)	-0.67 *p*=0.13 (N=296)
Gender						- (N=289)	0.2 *p*=0.001 (N=289)	0.07 *p*=0.11 (N=289)
Level of education							- (N=296)	-0.04 *p*=0.27 (N=296)
Do you live in a flood exposed area?								- (N=296)

4.1. Regression analyses

A multiple regression analysis was used to measure if there is a correlation between the actors' perceived likelihood of flood, and/or degree of worry and their mitigating behaviors. The significance of the analysis ($p<0.05$) as well as the value of R_2 (0.16), is reported in Table 6. The analysis shows that the most robust variable is "degree of worry" (β=-0.31). The variables' B coefficient has the same value at -0.31, and a significant *p*-value (0.00). The variable "coping appraisal" has a weak relationship with the outcome variable; the value of the standardized beta is 0.05, while the unstandardized betas' value is 0.06. These findings are however not significant (p=0.29).

The socio-demographic variables "age" (p=0.06), "Gender" (p=0.09), "Level of education" (p=0.9), and "Lives in a flood exposed area" (p=0.06) did also not have a significant connection to the outcome variable PB. Set aside from this, the variable "age" has a very

weak and negative effect on PB (*B*=-0.01), but it still has the third strongest relationship to the outcome variable (*β*=-0.1). The value of the standardized beta is approximately the same for gender (*β*=-0.09). However, the unstandardized beta is much higher with the latter (*B*=-0.16), indicating that the more of the participants are males, the more protective behavior would be reported. Of all the predictor variables included in the study, level of education has the weakest relationship with protective behavior (*β*=0.01). Similarly, the value of the unstandardized beta is very low (*B*=0.01). With the exception of DW, the participants' level of education has the strongest B coefficient, with a value of -0.18. The strength of this relationship is also the second-highest compared to the other predictor variables (*β*=-0.11).

Table 6

Variable	Protective behaviors			
	B	*SE B*	*β*	*Sig*
Degree of worry	-0.29	0.06	-0.29	0.00
Lives in a flood exposed area	-0.18	0.1	-0.07	0.23
Gender	-0.17	0.9	-0.1	0.07
Coping appraisal	0.07	0.05	0.05	0.29
Likelihood of exposure to flood	-0.03	0.05	-0.04	0.56
Level of education	0.01	0.04	0.02	0.9
Age	-0.01	0.003	-0.1	0.7

Note: Variables “Gender” and “Lives in a flood exposed area” are dichotomous; R^2=0.16, Adj. R^2=0.14 (p<0.05).

Table 7

	Protective behaviors	
	SE B	Sig
Degree og Worry	-0.36	0.00
INT	-0.02	0.57

R^2=0.13, Adj. R^2=0.13 (p<0.05).

The moderated multiple regression analysis shows a weak relationship that CA has a weak effect on the relationship between DW and PB (*B*=-0.02). This relationship is however not significant.

5. Discussion and conclusion

The goal of this study was to investigate what factors, specifically individuals' degree of worry, would motivate mitigating behaviors concerning climate change, for people living in Norway.

The analyses showed many interesting aspects. The descriptive statistics displayed in Table 4, show that the participants used for this study slightly favor the use of protective behaviors. However, most of these participants do not live in a flood-exposed area, as this variable's mean is 0.34, indicating that 34% of the participants live in a flood-exposed area. And one would argue that people who live in such areas, would be more prone to perform protective behaviors, than the people who do not, considering that they are the ones who would suffer. It is therefore surprising that the results showed the opposite. Especially, since LFA and LOF had a positive correlation. A reason for this could be that the citizens of these areas have a certain attachment to their village or municipality, and may feel that some of these particular protective behaviors would somewhat ruin its charm. However, the study did not measure this dimension, and consequently it can only be speculated. The results also show that the variable DW had positive correlation with LFA. This is as expected, considering that it is natural to be more worried about a potential flood, if it is more likely to occur. Furthermore, people who worry more would arguably have a lower threshold to consider their residential area as exposable to floods, which is in line with H_1 and H_2.

The correlation and regression analyses show that DW and LOF had a positive correlation. From an outside perspective this might not seem that surprising, as it is natural to assume that people who worry more about the possibility of a flood, also feel like it is more likely that one would occur. This is also in line with the PMTs' definition of risk perception, since the emotional and cognitive components are similar, but goes against my assumption that by adding the emotional component as a variable, when predicting risk perception, it would apply a new dimension to the study of predicting risk. Moreover, the first hypothesis of the study stated that the actors' degree of worry would promote protective behavior better than their cognitive probability measures. This hypothesis can not be supported. The results from both the correlation analysis and the regression analysis showcase that DW and PB had negative a correlation, which means that the more worried the individual is, the less inclined

he/she would be to adopt protective behaviors. Consequently H_2 will also be discarded, since it proposed that DW and PB had a positive correlation.

Ogunbode (2018) claimed that there was accumulating evidence that negative emotional reactions would lead to mitigating behaviors. While the analyses in this study told something different, it is important to note that Ogunbode never specified what any of these negative emotions were. Miceli's study (2008) had similar results to Ogunbode: He and his colleagues measured risk perception based on feelings of worry and observed a positive and significant relationship between feelings of worry and the adaptation of protective behavior. It is therefore unexpected that my studies' analyses had the opposite results. However, these results might stem from some specific factors: For instance, despite stating that there is growing evidence to show that negative emotional reaction leads to protective behaviors, Ogunbode further writes that negative emotional responses can also be unconstructive. This would particularly apply when these negative emotions are accompanied by a sense of powerlessness or lack of control over the current and unfolding changes (Ogunbode, 2018). And one could argue that a problem that is as big and universal as climate change might lead the actor to feel powerless, especially when there is no possibility of an instant fix. One would have to wait years to maybe notice a difference. In other words, a person who worries a lot about climate change might feel like mitigating behaviors would be pointless, since it would not help much anyway. However, the actors' coping appraisal may influence these feelings of powerlessness.

H_3 states that coping appraisal will moderate the effect that degree of worry has on protective behaviors. If the actor feels that the protective behaviors would help from damaging personal belongings, then they would be more inclined to perform them. Nonetheless, as the moderate multiple regression analysis shows, the results are not significant, which means we can assume that CA does not moderate the relationship between DW and PB. On the other hand, the internal consistency between the items measuring CA was weak. Of all the computed variables, this set was the only one lacking internal consistency from the factor analysis.. Furthermore, based on results from former research regarding coping appraisal and risk perception, e.g. Bubeck (2017) and Ogunbode (2018), it is natural to conclude that the study did not succeed in measuring the participants' coping appraisal. Therefore, all the results regarding the variable coping appraisal must be discarded. Nevertheless, in retrospect, these problems may have been avoided. Gathering the items from different studies may have had a

negative effect on the internal consistency. The set also did not contain more than three items. This is an extensive area, concerning many aspects, and the questions regarding the participants CA, may not have been specific enough to gather enough information on the subject.

The results of the study were surprising, but also interesting. It was unexpected to see a negative correlation between PB and DW, since it goes against the existing theory surrounding these variables. However, I would argue that the study has expanded the current theoretical field, and would encourage other researchers to further investigate the relationship between PB and DW. The results between the variables were highly significant, and it may have opened a new path in this research field. On the other hand, I will not recommend measuring CA as it was in this study, by virtue of a weak internal consistency and the insignificant results.

Regarding the studys' limitations, it was entirely composed of correlational data, so causal deductions of the variables can not be made. Furthermore, collecting data through self-reporting surveys has its limitations. Either it is conscious or unconscious people will often lean towards answers that are more socially acceptable, even if the survey is anonymous (Salters-Pedneault, 2020). For instance, some participants who live with their family, might have felt that the general assumption is that you should perform certain protective behaviors, as they also will protect other people. Another concern is that many of the participants have most likely not experienced a flood, and it could therefore be difficult for them to interpret many of the questions surrounding the potential occurrence of a flood. The sample size may be another limitation, as it was quite small, and consequently the margin of error was bigger, which negatively affects the reliability. Moreover, the sample was strictly taken from the Norwegian population, something Henrich (2020) has characterized as a WEIRD (western, educated, industrialized, rich and democratic) population, which does not reflect general human behaviors. This being said, the greatest limitation of the study was the measurement of CA, and for future research it will be necessary to conduct an item-set that gathers information of the participants CA more accurately.

In conclusion, the study showed that DW and PB had a moderate negative correlation. This stands in contrast to my prediction. However, former research has also indicated that if worried individuals stand upon big problems that could appear as unfixable, they would be

more prone to giving up, as their action would appear as useless. Furthermore, the participants' coping appraisal may also have affected the relationship between these variables, but since the variable CA was discarded as unreliable, this can only be speculated. Therefore, the three hypotheses of the study were rejected. Nevertheless, more comprehensive and integrative studies that measure and investigate the subjective perception of flood risk, in order to acquire data surrounding mitigating behaviors, is encouraged. The subject still bears rich fruit.

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Appendix

Link for NSD-approval:
file:///C:/Users/Erling%20Waldrop/Downloads/Meldeskjema%20for%20behandling%20av%20personopplysninger.pdf