

The Emotional Corona Pandemic

A study of how fear and anger affect risk assessment during the corona pandemic

*Soren Khidri, Rasmus Lindqvist, Caroline Mörner,
Andreas Perjons, Olivia Wahlgren, Theodor Årnfelt*

Abstract

The world is currently suffering from a global health crisis in the form of a coronavirus pandemic which causes the disease covid-19. This naturally affects people's lives and causes strong emotional responses, which as well influence how individuals perceive risk. Prior research demonstrated that anger decreased an individual's perceived risk whilst fear did the opposite and increased the perceived risk. Moreover, it is suggested that cognitive load has an impact on emotions' role in perception and decision making, by inhibiting emotional bias. This study examines to what extent fear and anger affects individuals risk assessment of the ongoing corona crisis, and whether cognitive load influences the potential emotional biases. The participants completed an online experiment where target emotions were induced while participants rated perceived risk of a number of behaviours relevant to the covid-19 pandemic. In addition, for both target emotions was a cognitive load task induced. Thus, the experiment consisted of four conditions with a total of 149 participants (N = 149, 68 women and 81 men). The hypothesis predicted that participants that were induced with anger would overall assess the risks of corona less than the participants that were induced with fear and that cognitive load would lessen the effect of the emotions. The study did not find any relevant significant differences between the conditions. Although the lack of findings is attributed to resource constraints, alteration of methodology and worldly circumstances. However, the study is concluded as valuable for different research fields as well as future research.

Introduction

The corona pandemic is doing damage both on an individual and societal level. Accordingly, one is obligated to feel strong emotion, which is a key ingredient to risk perception (Slovic, Finucane, Peters & MacGregor, 2004). Different states of emotion influence information processing, behaviour, and risk perception, which implies that individuals

might feel differently about covid-19 and the risks it brings.

To examine to what extent emotion influences risk perception in the current crisis, this study was inspired by previous research. Primarily one study, conducted by Lerner, Gonzalez, Small, and Fischhoff (2003), in the wake of the tragic events on September 11th. It demonstrated opposite effects of fear and anger on risk judgments and policy preferences.

To examine this an online experiment was conducted where target emotions (fear and anger) were induced while participants rated perceived risk of a number of behaviors relevant to the covid-19 pandemic. In addition, half of the participants for both target emotions answered these questions under cognitive load.

As such, anger and fear are the only emotional states examined. Also, risk assessment in other areas than a pandemic setting was not investigated.

Theory

Emotions and decision making

In modern days, researchers widely agree that emotions play a leading role in most meaningful decisions that humans are faced with. Emotions can be viewed as unconsciously guiding decisions as an attempt to regulate both positive and negative feelings (Keltner & Lerner, 2010). Furthermore, once the consequence of the decision is materialized

new emotions are normally perceived (Coughlan & Connolly, 2001).

Risk perception

Early studies indicate that negative emotion triggers a pessimistic risk assessment (Johnsson & Tversky, 1983), while more recent studies present that some negative emotions can trigger optimism (Lerner et al. 2003). It is suggested that fear arises from, and evokes judgments of uncertainty and situational control. Whereas anger is associated with judgments of certainty and individual control. Such emotional states can influence angry people to endorse different policies or actions, in contrast to what fearful people would support. Accordingly, it is suggested that research should be carried out to examine specific emotions rather than the global moods of negative and positive feelings (Lerner & Keltner, 2003).

Appraisal tendency framework

The appraisal-tendency framework is a multidimensional theoretical framework made for linking specific emotions to specific outcomes in judgment and decision making. Lerner & Keltner (2000) strived to present a theory beyond the valence framework, constructing the appraisal-tendency framework as a model of emotion-specific influences on judgement and choices. The theory of ATF, unlike valence, predicts that emotions of the opposite valence can exert similar influences on JDM outcomes whereas emotions of the same valence can exert opposing influences (Lerner et al., 2015).

Carry-over Effects

There is a long line of previous research that has studied how emotions potentially could influence following JDM. However, there is no final answer in the matter and there have been several potential reasons for this emotional carry-over effects on JDM.

Different theories account for different processing styles when forming a judgment. Individuals can turn to their memories to interpret information (Wyer & Srull, 1989), as well could individuals in an angry mood implicitly make more pessimistic risk assessments due to the strong carry-over effect of the initial negatively-valenced emotional state (Forgas, 2003). While Bower (1981) propose that affect and cognition are incorporated within an associative network of mental representation. Through a contrary perspective, studies have revealed that people who undergo negative moods may try to avoid effortful and unpleasant experiences by mood-repairing actions. Aligned with this view, would individuals induced with fear and anger make more optimistic risk assessments, in order to achieve this emotional adjustment.

Depth of Processing and Cognitive Load

The ATF suggests that anger and fear, despite their common negative valence, would have opposing carry-over effects due to their different appraisal tendencies, certainty and control. A subject induced with anger would perceive high certainty and control as well as attributing causality to internal factors to a greater extent than would fearful subjects (Small & Lerner, 2008). The angry subject perceives incidents as predictable and others as responsible for negative events, the anger will incline the person to engage in a more superficial processing style which involves rapid judgments without any deeper analysis. Fear, on the contrary, is thought to have low levels of certainty and control. Thus, the fearful subject carefully examines different outcomes of a decision, entailing a deeper and more systematic processing style in contrast to anger. The subject would attribute negative events to being under external and situational control that is unpredictable which is believed to require high cognitive effort (Small & Lerner, 2008).

Since anger and fear differ in information processing, an additional cognitive demanding task would therefore affect the outcome of the decisions. A high cognitive-load assessment would potentially inhibit the systematic processing triggered by fear.

Method

In order to test the research question, four different online versions of the experiment were developed. Participants were randomly assigned one condition. The manipulations between each condition were the emotions and cognitive load, making it a 2x2 between-subjects design. The conditions were constructed as follows: The participants were first presented with information regarding the study, which was followed by general questions about the participant. Next is the induction of emotion of either fear or anger, depending on which condition the participant had been assigned. Afterwards, the participants were asked questions regarding their feelings and risk assessments concerning different aspects of the covid-19 pandemic. Where applicable, these questions were answered while the participants were under induced cognitive load. The final part of the formula contained questions where the participants were asked to evaluate their emotional state after filling out the form, and the effect of the added cognitive load where it was present.

The 149 participants of the study, 68 women and 81 men, were found spread across the four groups distributed among them as follows: Condition 1: Fear (n = 42), Condition 2: Anger (n = 39), Condition 3: Fear and cognitive load (n = 35), Condition 4: Anger and cognitive load (n = 33).

Results

Reliability testing was performed across 19 risk assessment items used in statistical analysis to determine a Cronbach's alpha used as reliability score. Reliability score for the risk assessment responses was measured at $\alpha = 0.664$. Reliability testing was also performed

across the 4 items of the emotional estimate responses. Reliability score for the emotional assessment responses was measured at $\alpha = 0.896$.

Analysis of Variance (ANOVA) was conducted to measure the difference between the mean risk assessment response for each participant in each of the four different groups. The difference in three separate groupings of the four groups were measured. These three were if the participant was induced with fear or anger, if the participant was induced with cognitive load or not, and the third compared these two variables together. For the mean risk assessment response of the groups induced with anger and fear $F(3, 145) = 0.227, p = 0.634$. For the groups induced with cognitive load and not induced with cognitive load $F(3, 145) = 0.217, p = 0.642$. For the mean risk assessment response of the two earlier groupings together $F(3, 145) = 1.357, p = 0.246$. The results from this test reveals that there is no significant difference between the risk assessment in any of the compared grouping variations.

Analysis of Variance (ANOVA) was conducted to measure the difference between the residual means of risk assessment response for each participant in each of the four different groups. In this way the difference between "Risk regarding oneself" and "Risk regarding others" could be measured between the four groups. The difference in three separate groupings of the four groups were measured, in the same way as previously done. For the mean risk assessment response of the groups induced with anger and fear $F(3, 145) = 0.118, p = 0.732$. For the groups induced with cognitive load and not induced with cognitive load $F(3, 145) = 0.04, p = 0.828$. For the mean risk assessment response of the two earlier groupings together $F(3, 145) = 0.069, p = 0.692$. The results from this test reveals that there is no significant difference between any of the compared grouping variations.

Analysis of Variance (ANOVA) was conducted to measure the difference between the mean emotional estimate for each participant depending on if the participant had been induced with cognitive load or not. Two analyses were made with each analysis concerning a separate emotion but were performed in the same way. This was done to determine whether the induction of cognitive load affected the participants' estimate of their own perceived level of emotion relative to the emotion induced. For the mean emotional estimate of the groups induced with anger, the difference depending on if the participants were induced with cognitive load or not were measured at $F(1, 71) = 0.002, p = 0.962$. For the mean emotional estimate of the groups induced with fear, the difference depending on if the participants were induced with cognitive load or not were measured at $F(1, 77) = 0.044, p = 0.834$. The results from these tests reveal that there is no significant difference between any of the compared groups and therefore also no significant difference between the emotional estimate depending on whether cognitive load was induced or not.

Analysis of Variance (ANOVA) was conducted to measure the difference between the residual mean of emotional estimate before the induction of emotion and after the completion of the risk assessment (and therefore also the induction of emotion and cognitive load). In this way the difference between the emotional estimate before and after the induction of emotion and cognitive load could be measured between the four groups. This was done through calculating the residual mean by subtracting the mean emotional estimate after the risk assessment from the mean emotional estimate after the risk assessment for each participant, and then performing an ANOVA on these four groups. The difference in three separate groupings of the variables were measured. The first grouping was dependent on if the participants were induced with cognitive load or not. The second grouping was dependent on if the participants had been induced with anger or

fear. The third grouping compared these two variables together. For the residual mean emotional estimate depending on if the participants had been induced with cognitive load or not, the differences were measured at $F(3, 145) = 0.812, p = 0.369$ (figure 8). For the residual mean emotional estimate depending on if the participants had been induced with anger or induced with fear, the differences were measured at $F(3, 145) = 31.610, p < 0.001$ (figure 9). For the residual mean emotional estimate depending on these two groupings together, the differences were measured at $F(3, 145) = 0.509, p = 0.668$ (figure 10). The results from these tests reveal that there is a significant difference between the residual mean emotional estimate in the group induced with anger, compared to the group induced with fear. Residual mean emotional estimate for anger is measured at -0.901 and residual mean emotional estimate for fear is measured at 0.026. The participants induced with anger estimated their level of emotion to be significantly higher after the risk assessment (and the induction) compared to the group induced with fear.

Discussion

The ANOVA of risk assessment from either anger or fear and with or without cognitive load contradicts the hypothesis that fearful subjects would perceive higher risk in comparison to angry participants due to their different appraisal tendencies exposed by the ATF (Lerner & Keltner, 2000). These differences in risk assessment would be altered by an additional cognitive demanding task since anger and fear are thought to differ mainly between certainty and control. The analysis revealed though that fearful subjects without cognitive load experienced lower risk than angry subjects. The fearful participant also perceived higher risk during conditions of cognitive load in relation to angry participants. Since the results are not significant it is not possible to interpret these outcomes as generalizable. The reasons for these

unexpected inclinations could be several, it is possible that the targeted emotions were not experienced as strongly as anticipated, though results showing that participants were angrier after the test than before indicating that the emotional induction at least worked for inducing anger. Furthermore, it is crucial not to forget the extraordinary circumstances that we currently find ourselves in and the fact that the crisis is still ongoing. It could be possible that the initial emotional state in the participants could be other than neutral which would cause liability in the results.

The Anova tests also found that there are differences between the cognitive load group and the no-load group. The subjects that were exposed to cognitive load were more inclined to perceive less risk in relation to the no-load group, independently of elicited emotion. This is as predicted since it was inferred that further cognitive tasks would influence the emotional bias of risk assessment. These findings indicate that positive and negative affect seem to put different demands on the cognitive capacity. Whereas negative affect appears to motivate people to engage in more systematic and effortful processing styles that use a vast amount of cognitive capacity, positive affect consumes more superficial strategies. Since anger and fear both belong to the negative branch of the valence approach, they would be more demanding in their nature of processing. This is, however, an analysis from a valence-based point of view

Concerning the participants' perception of risk for others, the results indicate that the manipulation group of anger received a higher mean compared to the manipulation group of fear, thus implying that angry participants perceived less risk for others, compared to fearful participants. It is also demonstrated that the means reside in the negatives, for both manipulation groups, which suggest a general bias of perceiving greater "risk for others"

than "risk for self". Lerner et al., (2003) report similar results regarding "risk for others" in their study, as participants assigned negative events a lower probability of occurring to themselves, in contrast to the average American. Such estimates are suggested to reflect the availability bias, which is a systematic misconception that easily remembered events would be more representative due to their availability. Furthermore, it is often affected by external inputs that lead this skewed perception, such as media reports exaggerating other individual's evident vulnerability (Kahneman, Slovic & Tversky, 1982 in Lerner et al., 2003)

Lerner and Keltner (2001) and Small & Lerner (2008) used a control group in their methods with neutral emotional stimuli but we decided to go with a different approach for several reasons. One of the reasons being a lack of emotionally neutral stimuli during the current pandemic. Additionally, trying to induce a emotionally neutral state in the participants by asking questions about normally unnoteworthy habits could therefore result in high emotional reactions depending on how affected the participants were by the pandemic.

The cognitive load task was found to be tedious for the participants, perhaps a little too much so. This could have forced the participants to do a trade-off between the cognitive load task and the risk assessment questions. Neither were we able to account for participants who could not identify the different tones, as the study was performed online.

The original estimations made regarding the number of participants required to achieve statistical significance was around 400. However, the actual number of participants fell significantly lower, as the study only reached a total of 149 participants. The recruitment of participants occurred mainly

through various means over the internet which is a reliable method to attain the desired amount of participants according to previous studies (Ferrer et al., 2015). It does however appear that these methods of distribution were not enough to reach the number of people required. One possibility for the lack of participants is that due to the widespread nature of the pandemic, as usually is the case with pandemics, people might experience a kind of “pandemic burnout”. For the past few months people have gotten bombarded with information about the pandemic throughout most avenues of daily life (news coverage, the people around them and the societal effects as a whole). Considering this in combination with the negative nature of the pandemic, it does seem reasonable that most people might feel exhausted with issues regarding the coronavirus. Concerning the aspect of time restrictions, the amount of time available to conduct the study was limited from the start, meaning that recruitment could not be continued or changed since there needed to be time allotted to analysing the results gathered.

Conclusion

This study did not obtain any relevant significant differences, which in hindsight should not be considered a surprising outcome, owing to several factors such as resource constraints, alteration of methodology and worldly circumstances relating to this study.

However, the nonexistence of relevant significant measurements in this study should not be seen as diminishing to the value of the study itself. An immense amount of important information has still been provided through the conduction of this study. Even though research regarding this is already being conducted, this study still serves as one of the important first steps in the research considering induction of emotion and how cognitive load influences this across online media.

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