

Coping with Climate Change:

Understanding the Influence of Fear-Inducing Media Representations

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Abstract

The purpose of this study was to investigate whether fear-inducing media representation of climate change increase the level of perceived anxiety in the audience and leads to avoidant coping behaviour on climate related issues. It was expected that the participants tend towards an avoidance coping strategy after getting exposed to the negative, specifically fear-inducing, communication style about climate change. Additionally, it was expected that the relationship between negative communication style and avoidance coping is mediated by the emotion of anxiety. In case the expectations would've met, this study would have aimed to advance research in the realm of media portrayal to investigate for more effective styles of communication on the topic climate change, that motivates the audience to actively engage into climate benefitting behaviour.

To test the research question, an online questionnaire on Qualtrics was conducted. Two independent samples were either exposed to a positive communication style of climate change or a negative one in form of two video clips. In the questionnaire they must rate statements that measure their anxiety score and avoidance coping level, each one on a Likert scale ranging from strongly disagree to strongly agree. Next, several statistical tests were conducted on R, like linear regression analyses to evaluate if there are significant effects of each communication style on anxiety or avoidance coping, but also if there is a significant effect of anxiety on avoidance coping. Additionally, a Sobel test was conducted to check for a mediating effect of anxiety on the effect of communication style on avoidance coping.

Against the initial expectations, the results of the study did not provide significant evidence to support the assumption that negative communication style increases the audience's level of avoidance coping. Neither was a mediating effect of anxiety on the relationship between negative communication style and avoidance coping found. These findings challenge the assumption that a negative style of communication directly leads to an avoidance coping behaviour and highlights the importance of considering additional factors to this complex topic,

such as individual differences alongside pre-existing beliefs when studying the effects of fear-inducing messages.

In conclusion, the study did not demonstrate significant evidence that negative communication styles increase avoidance coping behaviours. Additionally, anxiety did not mediate the relationship between negative communication style and avoidance coping. These findings suggest that the direct connection between fear-inducing messages and avoidant behaviours is more complex than initially assumed and future research must consider additional factors, such as individual differences and pre-existing beliefs, to better understand the effects of fear-inducing media on climate-related behaviours. This study undermines the need for more effective approaches in media communication strategies and further work is required to identify communication styles that not only inform but also motivate the audience to engage in climate-benefitting behaviours.

Introduction

Climate change is one of the biggest challenges of our time, affecting ecosystems, economies, and societies around the world. In the media, messages about climate change often make their audience worried (Alnaser et al., 2022). The article by Lerner and Keltner (2000) points out that emotions like fear can strongly affect what people believe and how they make decisions. When it comes to talking about climate change these messages might focus on things like the environment getting worse, extreme weather happening more frequently or big disasters in the future. Hearing this can make one feel anxious and think something needs to be done about it immediately. But sometimes the problem seems too big, causing us as audience to feel like there's nothing we can do, or we might even try to ignore it (Roth & Cohen, 1986). That's why it is important to understand how individuals perceive and respond to the complex and often fear-inducing representations of climate change in the media, so that better ways to talk about climate change can be found, that help to act and feel hopeful about the future.

According to literature (Smith & Leiserowitz, 2014), there are several styles of communication about climate change in media to influence people's emotions and motivation to act. These include hopeful narratives, storytelling techniques or negative approaches like fear-based messaging. Emotions play a crucial role in shaping pro-environmental behaviour and coping mechanisms. According to the Emotional Response Theory (Lazarus, 1991), emotions such as fear, anxiety or hope can significantly influence how individuals respond to environmental threats. Due to its controversial nature and high potential for intended or unintended negative consequences, this study will specifically focus on fear-based messaging. Each approach aims to reach their audiences in different ways and shape their perceptions and responses to climate change. Qualitative research, such as that by O'Neill and Nicholson-Cole (2009) and Corner and Randall (2011) focus on communication strategies around climate change and suggest that fear-based communication styles of climate change can have limitations, which potentially lead to feelings of disengagement by making individuals avoid or deny the issue rather than taking action. For example, messages may focus on worst-case scenarios of climate change such as hurricanes or floods, aiming to shock their audience by highlighting potential dangers and risks that are associated with climate change. O'Neill and Nicholson-Cole (2009) found that fear-inducing messages can raise awareness about the severity of climate change, but they may also lead to feelings of helplessness and the previously mentioned disengagement among individuals. Their study suggests that fear-based approaches alone are not sufficient or effective when it comes to motivating individuals in taking action on the issue of climate change. Their research emphasises the need for nuanced communication strategies that go beyond inducing fear and inspire positive engagement with climate change. Positive engagement involves providing climate change messages in a way that focuses on solutions rather than problems. Studies show that positive messaging can foster optimism among individuals, leading to increased motivation in taking climate-related actions (Milfont et al., 2012).

Additionally, there may be some psychological barriers that prevent positive engagement with climate change. For example, findings from Lorenzoni et al. (2007) indicate that factors such as perceived distance from or uncertainty about climate change can hinder individuals' willingness to engage with the issue. Lorenzoni et al. (2007) found that individuals may perceive themselves as distant from climate change in space and time, leading to a sense of disconnection and reduced motivation to take action. Moreover, they highlight the role of uncertainty in shaping people's perceptions of climate change and imply that with greater uncertainty there comes decreased concern and engagement with the issue. Uncertainty in this context refers to different factors, such as uncertainty about what actions need to be taken to prevent climate change or the future impacts of climate change on people's lives. Their research underlines the importance of addressing these psychological barriers to foster positive engagement. To address these barriers, it is important to use clear and simple information about climate change. This includes explaining the causes, the consequences and what can be done about it. Additionally, by showing how it affects them personally and their community, climate change can feel more relevant to people's lives (Spence et al., 2012).

In summary, the impact of communication strategies on emotions and coping with climate change is complex. Coping strategies are methods individuals use to handle challenges or stressors they face, such as problem-solving actions, seeking support or avoidance behaviours (Folkman & Moskowitz, 2004). Fear-based approaches are commonly used in climate communication, but their effects on coping behaviours is not always clear. Therefore, gaining deep insights into the emotional responses and the coping mechanisms evoked by these strategies is necessary. This thesis aims to address this gap by trying to understand how people interpret and internalize fear-inducing representations of climate change in the media, as well as examining their emotional reactions in terms of anxiety and coping behaviours in terms of avoidance coping in response to those representations. In other words, it will be tested whether a negative style of communicating climate change issues, specifically a fear-inducing approach,

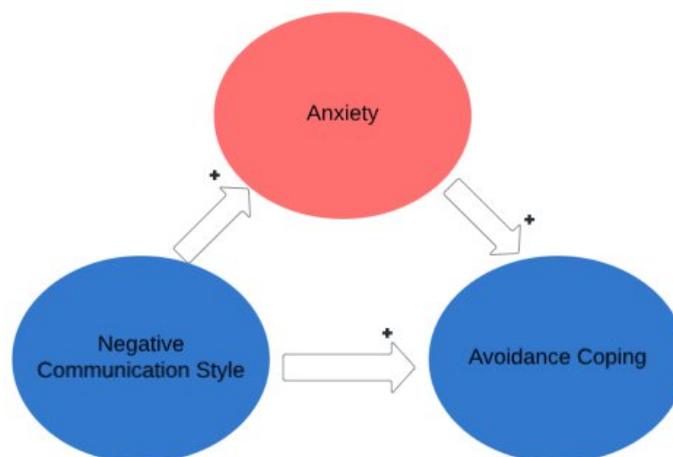
leads to an increased tendency to engage in avoidance coping behaviour. A meta-analysis by Witte and Allen (2000) suggests that fear-inducing messages can possibly anxiety, leading individuals to adopt avoidance coping strategies, to help them managing their emotional state. Therefore, it is crucial to investigate whether the relationship between negative communication style and avoidance coping is mediated by an increased anxiety level, which is caused by the negative communication style.

It is expected that negative communication style increases the level of avoidance coping and additionally increases the level of anxiety, which mediates the relationship between negative communication style and avoidance coping. If the expected results are confirmed, this study will contribute to literature by providing empirical evidence on how fear-inducing messages impact coping behaviours. Specifically, it will highlight the mediating role of anxiety in this relationship, giving insights into how negative emotional responses can lead to maladaptive coping strategies.

The null hypothesis formulated for this study suggests that there is no significant effect of negative communication style on people's level avoidance coping. Furthermore, the null hypothesis denies a significant mediation effect of anxiety on the relationship between negative communication style and avoidance coping.

Figure 1

Conceptual model



Design

For the study an experimental research design was chosen, meaning the participants are exposed to different independent variables (IV) to observe its effects on a dependent variable (DV). On the one hand, the IV the participants are exposed to, is the effect of either positive or negative communication style. The experiment is a between-subject design, therefore the respondents are split in two groups where each group perceives one of the two different communication styles in form of video clips. On the other hand, the DV that is affected by the IV is coping style, more precisely avoidance coping. Additionally, a mediator variable that may explain the relationship between the IV and the DV is included. This mediator is the emotional response, specifically anxiety. It will be assessed to explore its role in mediating the effect of negative communication style on avoidance coping. The data is collected and utilized in form of an online questionnaire, and each participant fills out one of them immediately after being exposed to the IV.

Materials

The study consists of an informed consent that informs the participants about the purpose of the study and how their data will be handled, initial questions in which the participants are asked about their demographic information (age, gender, nationality, education), questionnaire that the participants should answer and lastly, two videos from which one was shown to each participant. The study was conducted online in an environment called 'Qualtrics'.

Mini-COPE questionnaire

In the survey, questions from the Inventory of climate emotions (ICE) and the Mini-COPE questionnaires were incorporated. The Mini-COPE questionnaire assesses coping strategies which individuals use when facing stressful situations, and measures various coping mechanisms across different subscales such as avoidance coping, denial, or behavioural disengagement (Brambila-Tapia et al., 2023). For this study, six items from the Mini-COPE are included in the questionnaire, that measure avoidance coping. The scores indicate the frequency

of using each strategy, ranging from a minimum score of 0 (strongly disagree) to a maximum score of 3 (strongly agree). Higher scores suggest a greater tendency to execute that specific coping mechanism. For example, a high score on the "avoidance coping" subscale indicates the tendency to avoid stressors directly. An example question from the Mini-COPE that is used is: "I've been saying to myself 'this isn't real'."

ICE questionnaire

The ICE is a tool to capture emotional responses individuals experience concerning climate change, and evaluates a range of emotion such as anxiety, guilt, and enthusiasm (Marczak et al., 2023). Through the ICE, researchers can identify how individuals emotionally engage with climate related matters in order to inform strategies for communication and intervention. Scores on the ICE reflect the intensity and frequency of these emotions and range in our questionnaire from a minimum score of 0 (Strongly disagree) to a maximum score of 4 (Strongly agree). For example, a high score on the "anxiety" subscale suggests a heightened sense of worry about the consequences of climate change. An example question used from the ICE is: "I fear how climate change will affect me and my loved ones." Four items of this questionnaire were included in our research.

Climate change videos

Next to the questionnaire, two video clips are included in the survey, which are climate change related. One video is a news report and informs the audience about climate change in a negative style of communication by putting strong emphasis on natural disasters and financial consequences. It can be found on YouTube (Link: Appendix) and has the title: "White House climate report says effects of climate change are worsening". To test whether the participants have seen the video and paid attention to it, there will be a control question asking about specific details about the content in each the clip. For the video of the negative communication style the question is: "What is the financial damage of weather disasters addressed in the clip?", with a correct answering option (1 Billion/Every 3 weeks) and an incorrect one (2 Billion/Every

month). The other video uses a more positive approach by encouraging the viewer to take action on climate related issues. It's called "Youth for Climate Action. Breaking barriers | Youth and Climate Change" and is also found on YouTube (Link: Appendix). The control question for the positive communication style video is: "What is, according to the video, a solution to fight climate change?", having a correct option (Change of mentality) and an incorrect option (Only planting trees).

Participants

The majority of the gathered participants are current university students or employees with a university degree and a small portion were still highschoolers. They were reached out to by sharing the link to the study with friends, family, or university students. Additionally, the method of snowball sampling was used to gather participants, meaning the questionnaire was sent to people for participation, who then send it to friends, family, or colleagues as well. A total of 170 people were invited to conduct the experiment and in the end 101 respondents were included in the study.

Procedure

At first, after the questionnaire was finalized, it was sent to the BMS Ethics Committee, who approved of the research. Next, the link to the questionnaire was shared in online platforms like Instagram or directly send to individuals to gather a high number of participants. Additionally, the survey was published in the online platform 'Sona', so that University students can gather extra credits as a reward for participating in the study, leading to more people willing to conduct the questionnaire.

Before the questionnaire is given however, the participants are asked to fill out a consent form. The consent form informs the participants about the study, expected risks, data handling and anonymization. In this study, data was anonymized, and participants were able to stop the study at any time. By agreeing to the informed consent form in Qualtrics they gave consent for their data to be used for the research. Next, the participants are asked to give their

demographical data including age, gender, nationality and information about their highest level of education.

In the next step the participants are asked to watch one of the two video clips on YouTube about climate change. The video they get to watch was randomly assigned to them, by using a function in Qualtrics, that randomly assigns one of the two links to the participants. After watching the video, the participants were asked to answer the control question, so that it can be verified whether they've seen the video.

Lastly, the participants completed the remaining questionnaires including the ICE and Mini-COPE.

Data Analysis

The data analysis software that is used to analyse the data gathered from these questionnaires is R.

At first, a G*Power analysis is conducted to determine the sample size necessary for detecting a significant effect.

Next, the data is screened in order to have a proper final dataset to work with. Cases that potentially distort the results are excluded, such as participants who didn't complete the questionnaire or participants who gave unusual and unrealistic responses. Such unusual responses include people who give the same response for every item, as this could mean that they didn't pay close attention to the questionnaire and wanted to finish it as quickly as possible. Also, participants who answered the control questions for the video clips incorrectly are excluded. Additionally, categorical variables are transformed into numerical variables. For instance, the response "disagree" on an item from the ICE gets the value '1' assigned to.

After screening the data, reliability of the final dataset is determined by calculating Cronbach's alpha for each validated scale. A high Cronbach's alpha suggests greater degree of interrelatedness among items and therefore, indicates that they are measuring the same

underlying concept. Reliability coefficients for each item above the recommended threshold of 0.60 are acceptable (Nunnally & Bernstein, 1994).

The final step is to conduct analyses to answer the research question and test the hypothesis. To achieve this, two linear regression analyses are employed to investigate the relationship between individuals' communication style (positive vs. negative) and their reported levels of anxiety, as well as their engagement in avoidance coping behaviours. In addition, a third analyses is conducted to test the relationship between anxiety and avoidance coping. Probability values (p-value) smaller than the common threshold of 0.05 indicate a statistically significant effect between the variables (Imbens, 2021). The anxiety level is assessed from the items of the ICE, while the avoidance coping behaviour will be assessed through the Mini-COPE questions.

Furthermore, a Sobel test is conducted to explore a potential mediating role of anxiety in the relationship between communication style and avoidance coping behaviour. A p-value smaller than 0.05 indicates a significant mediating effect (Preacher & Hayes, 2004).

Results

Descriptive statistics

A total of 170 participants started the questionnaire and 60 participants were excluded from the dataset due to not finishing the questionnaire. Another 9 were excluded due to answering the control questions incorrectly. 49 participants were exposed to the positive communication style video while 52 people were shown the negative communication style clip (Table 1). The analysis was conducted with 101 participants ranging in age between 18 and 64 ($M = 26.25$, $SD = 10.1$) (Table 1). In terms of gender 67 participants are female, 32 are male and two identify as third gender/non-binary (Table 1). The majority of the participants are either Dutch (54 participants) or German (35 participants) while 12 were from other countries (Table 1). Regarding the level of education, the vast majority are either current university students or have an university degree (90 participants) while the rest are highschoolers (Table 1).

Table 1*Demographics*

	Positive Communication Style	Negative Communication Style
Total amount	49	52
Gender		
Male	12 (24%)	19 (36%)
Female	37 (76%)	31 (60%)
Third Gender	0	2 (4%)
Age		
18-25	37 (76%)	41 (79%)
26-40	6 (12%)	7 (13%)
41-65	6 (12%)	4 (8%)
Nationality		
Dutch	24 (48%)	30 (58%)
German	18 (37%)	17 (32%)
Other	7 (15%)	5 (10%)
Education		
Highschool	2 (4%)	7 (13%)
Technical college (MBO/Fachoberschule)	1 (2%)	0
University (Bachelor/Master)	38 (78%)	37 (72%)
University of applied science (HBO/Fachoberschule)	8 (16%)	8 (15%)

Note. This table represents the total amount of participants in the positive and negative communication style group and the number of participants from both groups in each subcategory.

Numbers in the table represent the amount of participants in each category and percentages represent the portion of participants from each group in every category.

The results have shown that the participants who were exposed to the positive communication style displayed a moderate mean anxiety score, which was slightly higher than the score of the negative communication style group (Table 2).

In terms of anxiety the positive communication style group obtained a moderate score, while the audience of the negative communication style had a slightly higher score in comparison (Table 2). Similarly, both groups obtained a moderate avoidance coping score, with a slightly higher avoidance coping level in the negative communication style group (Table 2).

Table 2*Anxiety scores*

	Positive Communication Style	Negative Communication Style
Mean	2.371	2.474
Standard Deviation	0.772	0.890

Table 3*Avoidance coping scores*

	Positive Communication Style	Negative Communication Style
Mean	1.028	1.049
Standard Deviation	0.424	0.405

Reliability analyses

The ICE scale demonstrated a Cronbach's Alpha of 0.68, indicating moderate reliability. The Mini-COPE scale showed a slightly higher Cronbach's Alpha of 0.72, which indicates acceptable reliability. These scores show that for both scales the set of items are closely related as a group and measure the same underlying concept. Every item on both scales has a reliability coefficient above the recommended threshold of 0.60, therefore no item needs to be excluded.

Linear Regression Results for Communication Style and Avoidance Coping

The results indicate that communication style is not a significant predictor of avoidance coping behaviour (Table 4). These findings suggest that individuals' tendencies to engage in avoidance coping strategies are not influenced by whether they are exposed to either positive or negative communication style. Furthermore, the model accounted for a negligible amount of variance in avoidance coping behaviour ($R^2 = 0.0006509$, $F(1, 99) = 0.064$, $p = 0.801$), showing that other factors beyond communication style could play a bigger role in determining avoidance coping behaviours.

Linear Regression Results for Communication Style and Anxiety

The results similarly revealed that communication style did not significantly predict anxiety levels (Table 4), suggesting that whether individuals are informed in positive or negative manner, it does not have a notable impact on their experienced levels of anxiety. Additionally, this model explains a small proportion of the variance in anxiety ($R^2 = 0.00388$,

$F(1, 99) = 0.382, p = 0.538$), indicating that other factors than communication style could be more influential in determining anxiety levels among individuals.

Linear Regression Results for Anxiety and Avoidance Coping

The last linear regression analysis showed that anxiety does significantly predict avoidance coping behaviour (Table 4). It indicates that higher levels of anxiety are associated with increased tendencies to engage in avoidance coping behaviour. 13.18% of the variance in avoidance coping behaviour ($R^2 = 0.1318, F(1, 99) = 14.88, p < 0.001$) are explained by this model, suggesting that anxiety is a notable factor in determining avoidance coping. The significant relationship highlights that individuals who experience higher anxiety levels are more likely to adopt avoidance coping strategies.

Table 4

Correlation matrix

	Mean	SD	1	2	3
1. Communication Style	-	-	1	-.103	-.021
2. Anxiety	2.42	.832	-.103	1	.362*
3. Avoidance Coping	1.04	.413	-.021	.362*	1

Note. This table demonstrates the correlations between each variable among the participants ($N = 101$).
* $p < .001$.

Sobel Test Results for Mediation Analysis

The results of the Sobel test revealed a non-significant indirect effect of communication style on avoidance coping through anxiety ($z = 0.012, p = 0.991$), indicating that anxiety does not mediate the relationship between communication style and avoidance coping behaviour. Therefore, contrary to the initial hypothesis, anxiety does not appear to serve as a mediator in this relationship.

Discussion

The purpose of this study was to investigate whether fear inducing approaches of communicating climate change issues cause anxiety, which leads to an avoidant coping

behaviour. It was expected that the shown news report, which emphasizes on fatal environmental and financial consequences, would enhance the participants' level of anxiety causing them to lean towards an avoidant coping behaviour in terms of dealing with climate related issues. Contrary to the initial expectations, the results of this study did not provide evidence to support this claim. Despite the study showing a significant effect of high anxiety levels on increased engagement into avoidance coping, no significant association was found, through the linear regression models, between communication styles to either anxiety level or avoidance coping. Neither was a significant indirect effect of communication style on avoidance coping through anxiety found in the Sobel test. In general, both the positive and the negative communication style group, displayed moderate mean anxiety and avoidance coping scores (Table 4). These findings suggest that communication styles do not automatically lead to specific emotional or behavioural outcomes within people. The results are consistent with some existing literature that questions the impact of fear-inducing media on avoidance coping behaviour. For example, O'Neill and Nicholson-Cole (2009) found that fear appeals can raise awareness, but they do not necessarily lead to behavioural change. Similarly, Hart and Feldman (2014) found that fear-inducing messages about climate change do not always increase anxiety or avoidance behaviours and suggest that audiences may respond with scepticism and doubts about the actual scope of the topic. Additionally, Hart and Feldman (2018) also argued that the impact of fear appealing media representations is highly related to the individual's pre-existing beliefs about climate change, indicating that not every person reacts to fear-inducing media in the same way. These studies alongside the findings of this experiment suggest that the relationship between communication styles, emotional responses, and coping behaviours is complex and could be influenced by many factors such as differences in environmental concern or existing beliefs about climate change.

Important facets that contribute to the results, are strengths and limitations of the conducted research. One strength of this study includes the standardized measurement of

anxiety and avoidance coping, ensuring consistency in the assessment across all participants. However, there are also limitations within the study, which contributed to the non-significant results. One of those weaknesses is the small sample size. According to the G*power analysis the experiment with 200 participants was too short, which limits the generalizability of the findings. Therefore, further research with a larger sample is recommended, since the low number of participants can be a crucial factor for the results. The second limitation lies within the analyses of the final dataset. Given the non-significant results of two linear regression models in this study, future research should consider using t-tests instead. T-tests are ideal for comparing means between two groups, such as positive against negative communication style groups, and can provide clear insights into group differences (Field, 2013). Additionally, t-tests are simpler to interpret and more suitable for determining possible significant differences in variables like anxiety levels or avoidance coping behaviours between groups (Cohen 1988). Furthermore, while the study focused on the effect of communication style on anxiety and avoidance coping behaviours, other potential factors should be considered to get a more accurate understanding of the observed phenomena. As mentioned, differences regarding environmental concern and prior existing knowledge about climate change can possibly mediate the impact of fear-inducing messages. Participants who are already highly concerned about climate change or have knowledge possibly react differently to fear-inducing media representations compared to those who are less informed or concerned (Hornsey et al, 2016). Additionally, a potential reason why the study didn't show significant results in terms of the avoidance coping is that the coping behaviour of the audience already existed prior to watching the video clip about climate change and a short media representation won't immediately affect the participants' coping style. For future research it is advisable to expose the participants to several media representations over a longer time period before handing them the questionnaires to fill out. This ensures that they have enough time processing the information they are getting, which increases the chance of change in their coping behaviour. Lastly, additional factors that should be included in future

research are personality traits such as optimism or general anxiety sensitivity, which potentially influence how individuals respond to fear-inducing messages (Connor & Davidson, 2003).

The findings of the study have important implications for future research on the impact of climate change representation in media. They highlight the complexity of the matter and imply the importance of considering individual differences alongside pre-existing beliefs when studying the effects of fear-inducing messages. Future research needs to include a bigger sample with varying levels of environmental concern and knowledge to better understand the responses to media representations of climate change. Additionally, longitudinal studies that measure the effects of repeated exposure over time are necessary to determine whether and how media influence coping strategies. Lastly, investigating other mediating and moderating factors, such as personality traits may provide a better understanding of the mechanisms at play.

In conclusion, while the study aimed to explore the impact of fear-inducing media portrayals of climate change on avoidance coping behaviour, the results did not support the expected relationship mediated by anxiety. The lack of significant findings suggests that the influence of communication styles on emotional and behavioural responses are not straightforward and may be mediated by various other factors. These insights underline the need for a more detailed approach in the future in order to understand how people respond to climate change media, emotionally and behaviourally. It's important to understand these dynamics and relationships, so that effective communication strategies are created, which encourage people to engage with and take action on climate change.

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Appendix

Positive communication style:

<https://youtu.be/5B8eajiYzjE?si=U9o3erDzjJ5j2wvq>

Negative communication style:

<https://youtu.be/oUsddpT9cGo?si=R1d5ogD93gHhqXOv>

R-code:

```
install.packages("readxl")
```

```
library(readxl)
```

```
data <- read_excel("C:\\Users\\samua\\OneDrive - University of  
Twente\\BachlorThesis\\Dataset3.xlsx")
```

```
head(data)
```

```
#'Descriptive Analysis'
```

```
summary(as.numeric(data$Age))
```

```
#average age
```

```
mean(as.numeric(data$Age))
```

```
sd(as.numeric(data$Age))
```

```
#gender distribution
```

```
gender_counts <- table(data$Gender)
```

```
print(gender_counts)
```

```
#nationality distribution
```

```
nationality_counts <- table(data$Nationality)
```

```
print(nationality_counts)
```

```
#education distribution
```

```
education_counts <- table(data$Education)
```

```
print(education_counts)

install.packages("dplyr")
library(dplyr)

# Split the data into subgroups based on Communication style
positive_group <- data %>% filter(Communication == 1)
negative_group <- data %>% filter(Communication == 0)

# Summarize Age for each subgroup
summary_age_positive <- summary(as.numeric(positive_group$Age))
summary_age_negative <- summary(as.numeric(negative_group$Age))

# Gender distribution for each subgroup
gender_distribution_positive <- table(positive_group$Gender)
gender_distribution_negative <- table(negative_group$Gender)

# Nationality distribution for each subgroup
nationality_distribution_positive <- table(positive_group$Nationality)
nationality_distribution_negative <- table(negative_group$Nationality)

# Education distribution for each subgroup
education_distribution_positive <- table(positive_group$Education)
education_distribution_negative <- table(negative_group$Education)

cat("Summary of Age for Positive Communication Group:\n")
print(summary_age_positive)

cat("\nSummary of Age for Negative Communication Group:\n")
print(summary_age_negative)

cat("\nGender Distribution for Positive Communication Group:\n")
print(gender_distribution_positive)
```

```
cat("\nGender Distribution for Negative Communication Group:\n")
print(gender_distribution_negative)
```

```
cat("\nNationality Distribution for Positive Communication Group:\n")
print(nationality_distribution_positive)
```

```
cat("\nNationality Distribution for Negative Communication Group:\n")
print(nationality_distribution_negative)
```

```
cat("\nEducation Distribution for Positive Communication Group:\n")
print(education_distribution_positive)
```

```
cat("\nEducation Distribution for Negative Communication Group:\n")
print(education_distribution_negative)
```

```
# Categorize age into specified age groups
```

```
data <- data %>%
  mutate(Age_Group = case_when(
    Age >= 18 & Age <= 25 ~ "18-25",
    Age >= 26 & Age <= 40 ~ "26-40",
    Age >= 41 & Age <= 65 ~ "41-65",
    Age > 65 ~ "65+",
    TRUE ~ "Unknown"
  ))
```

```
# Split the data into subgroups based on Communication style
```

```
positive_group <- data %>% filter(Communication == 1)
negative_group <- data %>% filter(Communication == 0)
```

```
# Age group distribution for each subgroup
```

```
age_distribution_positive <- table(positive_group$Age_Group)
age_distribution_negative <- table(negative_group$Age_Group)
```

```

# Print the results
cat("Age Group Distribution for Positive Communication Group:\n")
print(age_distribution_positive)

cat("\nAge Group Distribution for Negative Communication Group:\n")
print(age_distribution_negative)

#communication style distribution
communication_counts <- table(data$Communication)
print(communication_counts)

# Putting participants in one of two groups
#positive_group <- subset(data, Communication == "Positive")
#negative_group <- subset(data, Communication == "Negative")

#Recoding values ICE
install.packages("dplyr")
install.packages("vctrs")

library(dplyr)

data <- mutate(data,
  ICE_1 = recode(ICE_1, "Strongly disagree" = 0, "Somewhat disagree" = 1,
    "Neither agree nor disagree" = 2, "Somewhat agree" = 3, "Strongly agree"
= 4),
  ICE_2 = recode(ICE_2, "Strongly disagree" = 0, "Somewhat disagree" = 1,
    "Neither agree nor disagree" = 2, "Somewhat agree" = 3, "Strongly agree"
= 4),
  ICE_3 = recode(ICE_3, "Strongly disagree" = 0, "Somewhat disagree" = 1,
    "Neither agree nor disagree" = 2, "Somewhat agree" = 3, "Strongly agree"
= 4),

```

```

ICE_4 = recode(ICE_4, "Strongly disagree" = 0, "Somewhat disagree" = 1,
               "Neither agree nor disagree" = 2, "Somewhat agree" = 3, "Strongly agree"
= 4),
ICE_5 = recode(ICE_5, "Strongly disagree" = 0, "Somewhat disagree" = 1,
               "Neither agree nor disagree" = 2, "Somewhat agree" = 3, "Strongly agree"
= 4),
ICE_6 = recode(ICE_6, "Strongly disagree" = 0, "Somewhat disagree" = 1,
               "Neither agree nor disagree" = 2, "Somewhat agree" = 3, "Strongly agree"
= 4)
)

```

#Recoding values Mini_COPE

```

data <- mutate(data,
               Mini_COPE_1 = recode(Mini_COPE_1, "Strongly disagree" = 0, "Somewhat
disagree" = 1,
                                   "Somewhat agree" = 2, "Strongly agree" = 3),
               Mini_COPE_2 = recode(Mini_COPE_2, "Strongly disagree" = 0, "Somewhat
disagree" = 1,
                                   "Somewhat agree" = 2, "Strongly agree" = 3),
               Mini_COPE_3 = recode(Mini_COPE_3, "Strongly disagree" = 0, "Somewhat
disagree" = 1,
                                   "Somewhat agree" = 2, "Strongly agree" = 3),
               Mini_COPE_4 = recode(Mini_COPE_4, "Strongly disagree" = 0, "Somewhat
disagree" = 1,
                                   "Somewhat agree" = 2, "Strongly agree" = 3),
               Mini_COPE_5 = recode(Mini_COPE_5, "Strongly disagree" = 0, "Somewhat
disagree" = 1,
                                   "Somewhat agree" = 2, "Strongly agree" = 3),
               Mini_COPE_6 = recode(Mini_COPE_6, "Strongly disagree" = 0, "Somewhat
disagree" = 1,
                                   "Somewhat agree" = 2, "Strongly agree" = 3),
               Mini_COPE_7 = recode(Mini_COPE_7, "Strongly disagree" = 0, "Somewhat
disagree" = 1,
                                   "Somewhat agree" = 2, "Strongly agree" = 3),
               Mini_COPE_8 = recode(Mini_COPE_8, "Strongly disagree" = 0, "Somewhat
disagree" = 1,
                                   "Somewhat agree" = 2, "Strongly agree" = 3)
)

```

)

```
# calculate average scores for anxiety
```

```
data$Anxiety <- rowMeans(data[, c("ICE_1", "ICE_2", "ICE_3", "ICE_4", "ICE_5",  
"ICE_6")])
```

```
# calculate average scores for avoidance coping
```

```
data$Avoidance_Coping <- rowMeans(data[, c("Mini_COPE_1", "Mini_COPE_2",  
"Mini_COPE_3", "Mini_COPE_4", "Mini_COPE_5", "Mini_COPE_6", "Mini_COPE_7",  
"Mini_COPE_8")])
```

```
head(data[c("Anxiety", "Avoidance_Coping")])
```

```
unique(data$Communication)
```

```
unique(data$Avoidance_Coping)
```

```
unique(data$Anxiety)
```

```
# factor communication
```

```
data$Communication <- factor(data$Communication, levels = c("Negative", "Positive"),  
labels = c(0, 1))
```

```
# check variable communication
```

```
class(data$Communication)
```

```
sum(is.na(data$Communication))
```

```
install.packages("tidyverse")
```

```
library(tidyverse)
```

```
# Conduct linear regression for Avoidance Coping using Anxiety as the predictor
```

```
model_anxiety_avoidance <- lm(Avoidance_Coping ~ Anxiety, data = data)
```

```
# Summary of the regression model
```

```
summary(model_anxiety_avoidance)
```

```

# linear regression Coping
model_avoidance <- lm(Avoidance_Coping ~ Communication, data = data)

# Summary results
summary(model_avoidance)

# Linear Regression Anxiety
model_anxiety <- lm(Anxiety ~ Communication, data = data)

# Summary results
summary(model_anxiety)

# calculate indirect effects
indirect_effect <- coef(model_anxiety)["Communication1"] *
coef(model_avoidance)["Communication1"]

# calculate standard error indirect effects
se_indirect_effect <- sqrt((coef(summary(model_anxiety))["Communication1", "Std.
Error"])^2 +
                           (coef(summary(model_avoidance))["Communication1", "Std. Error"])^2)

# calculate z-value
z_value <- indirect_effect / se_indirect_effect

# calculate p-value
p_value <- 2 * (1 - pnorm(abs(z_value)))

# report results
cat("Indirect effect:", indirect_effect, "\n")
cat("Standarderror of inderect effect:", se_indirect_effect, "\n")
cat("z-value:", z_value, "\n")
cat("p-value:", p_value, "\n")

```

```

install.packages("knitr")
library(knitr)

# Berechne deskriptive Statistiken für die Positive Communication Gruppe (Anxiety)
positive_anxiety_stats <- data %>%
  filter(Communication == 1) %>%
  summarise(
    mean = mean(Anxiety, na.rm = TRUE),
    sd = sd(Anxiety, na.rm = TRUE),
    min = min(Anxiety, na.rm = TRUE),
    max = max(Anxiety, na.rm = TRUE),
    median = median(Anxiety, na.rm = TRUE)
  )

# Berechne deskriptive Statistiken für die Negative Communication Gruppe (Anxiety)
negative_anxiety_stats <- data %>%
  filter(Communication == 0) %>%
  summarise(
    mean = mean(Anxiety, na.rm = TRUE),
    sd = sd(Anxiety, na.rm = TRUE),
    min = min(Anxiety, na.rm = TRUE),
    max = max(Anxiety, na.rm = TRUE),
    median = median(Anxiety, na.rm = TRUE)
  )

# desriptives positive group (Avoidance Coping)
positive_avoidance_stats <- data %>%
  filter(Communication == 1) %>%
  summarise(
    mean = mean(Avoidance_Coping, na.rm = TRUE),
    sd = sd(Avoidance_Coping, na.rm = TRUE),
    min = min(Avoidance_Coping, na.rm = TRUE),

```

```

    max = max(Avoidance_Coping, na.rm = TRUE),
    median = median(Avoidance_Coping, na.rm = TRUE)
)

# descriptives negative group (Avoidance Coping)
negative_avoidance_stats <- data %>%
  filter(Communication == 0) %>%
  summarise(
    mean = mean(Avoidance_Coping, na.rm = TRUE),
    sd = sd(Avoidance_Coping, na.rm = TRUE),
    min = min(Avoidance_Coping, na.rm = TRUE),
    max = max(Avoidance_Coping, na.rm = TRUE),
    median = median(Avoidance_Coping, na.rm = TRUE)
  )

print("Descriptive Statistics for Positive Communication Group (Anxiety)")
print(kable(positive_anxiety_stats, col.names = c("Mean", "SD", "Min", "Max", "Median")))
print("Descriptive Statistics for Negative Communication Group (Anxiety)")
print(kable(negative_anxiety_stats, col.names = c("Mean", "SD", "Min", "Max", "Median")))
print("Descriptive Statistics for Positive Communication Group (Avoidance Coping)")
print(kable(positive_avoidance_stats, col.names = c("Mean", "SD", "Min", "Max",
"Median")))
print("Descriptive Statistics for Negative Communication Group (Avoidance Coping)")
print(kable(negative_avoidance_stats, col.names = c("Mean", "SD", "Min", "Max",
"Median")))

```