

**The Effect of Different Types of Humour on the Intention to take Climate Action and
Eco-Anxiety**

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Abstract

Climate change is one of the biggest threats to mankind. While some devastating effects of climate change are clear to see, such as floodings and droughts, it has a more hidden, adverse effect on mental health as well. A significant cause of climate change is human behaviour, therefore, it is crucial to understand what drives pro-environmental behaviour. Research shows that humour can persuade people to take climate change action. This study investigates this topic further by exploring the impact of two types of humour, disparaging and affiliative humour, on climate action intention and eco-anxiety. Three hypotheses were developed: firstly, a greater intention to take climate action is hypothesised for those in the affiliative humour condition. Secondly, a positive correlation between eco-anxiety and climate change action is expected. Lastly, the relationship between eco-anxiety and action intention is hypothesised to be stronger in the disparaging group than in the affiliative group. To test this an online questionnaire was used. Participants were divided into two humour conditions and presented with corresponding cartoons. Afterwards, they were asked questions about their intentions to fight climate change, and their level of eco-anxiety. Data was treated with a number of non-parametric statistical techniques. Results show no support for the first and third hypothesis, but the second hypothesis was supported by the findings. This result highlights the positive correlation between eco-anxiety and climate action intention. This work is concluded by an evaluation of the present research and suggestions for future research.

Keywords: climate change, collective action, humour, eco-anxiety

The Effect of Different Types of Humour on Eco-anxiety and the Intention to take Climate Action

The World Health Organization (WHO) has called climate change one of the most fundamental challenges of the current century. The organization further claims that “protecting health from its impacts is an emerging priority for the public health community” (2009, p. ii). Not only is climate change a threat to physical health, it can also have adverse effects on mental health. The WHO has described several negative effects on mental health caused by climate change, such as distress, grief and anxiety (Clayton et al., 2021). As climate change is predominantly human-induced (IPCC, 2022), a crucial component to fight climate change is changing people’s behaviour (Gifford et al., 2011). Therefore, it is increasingly urgent for the scientific community to understand how can people be influenced to act in a more pro-environmental manner. To add to the knowledge in this area, the current research will investigate the effects of different types of humour on climate change action intention. The two types of humour are affiliative humour and disparagement humour. The term *climate change action intention* is used to describe behavioural intentions that have a positive influence on the climate change crisis. Both collective action, like signing petitions, and individual action intentions, like using a reusable bag, are included. Another part of this research will focus on eco-anxiety; a phenomenon frequently discussed in the media. *Eco-anxiety* entails people feeling anxiety, dread, or worry due to the changes in our climate (Passmore et al., 2022). The current research will investigate the correlation between eco-anxiety and action intention. Below, all the relevant terms will be defined further, and past literature will be discussed.

Climate Change

To start, it is important to understand what climate change is. Climate change refers to a global phenomenon that involves a long-term shift in temperature and weather. These type of weather shifts occur naturally with time, but the current changes to the climate are predominantly human-induced (IPCC, 2022). When thinking about climate change, most people will mention rising temperatures; however, other consequences of climate change are just as detrimental, such as rising sea levels, higher chances of extreme weather-events and

food shortages. These consequences pose a serious threat to not only our ecosystems, but to also our physical and mental health (IPCC, 2022). The biggest cause of climate change, greenhouse gasses, are predominantly emitted by human behaviours, such as generating electricity by burning fossil fuels, cutting down trees for commercial purposes, and the mass production of food (Perera, 2017; Sims et al., 2003). Consequently, changing human behaviour plays a crucial role in mitigating the effects of climate change (Gifford et al., 2011). However, Gifford et al. also claim that "human behaviour is the least-understood aspect of the climate change system" (2011, p. 801). Because of this lack of knowledge, it is important to research what drives people to take climate action, and how to persuade those who are unwilling to take action up to this point. The current research will explore the influence of humour type on climate action intention, as well as the relationship between eco-anxiety and climate action intention.

Mental Health and Eco-anxiety

As mentioned before, the impacts of climate change go beyond the environment and our physical health: it can also affect our mental health. The World Health Organization has described a wide range of negative effects climate changes can have on mental health, such as distress, grief, psychopathology and emotional issues (Clayton et al., 2021). Of course, directly experiencing climate change, in the shape of flooding, destroyed livelihoods or severe injuries, will lead to psychological trauma (Clayton et al., 2021). These are called the acute consequences of climate change. Yet, climate change also impacts the mental health of those who do not directly suffer these types of consequences. Even gradual changes to weather patterns can have severe impacts on mental health. Clayton et al. (2021) describe this as chronic psychological consequences rather than acute consequences. This means that everyone can experience mental health issues as a result of climate change, independently of living environment and experiences. Subsequently, as the climate change crisis grows bigger, so will the mental health problems associated with it. Therefore, it is crucial for the scientific community to research mental health issues caused by climate change.

To do this, the current research will focus on one specific phenomenon concerning mental health and climate change, namely eco-anxiety. *Eco-anxiety* is defined by the feeling of fear for environmental doom. The affective symptoms of eco-anxiety are feelings of worry, anxiety, and dread due to changing climate (Passmore et al., 2022). Clayton and Karazsia (2020) also identified functional impairments, such as sleep difficulties, and cognitive and emotional impairments due to eco-anxiety. It is important to mention that eco-anxiety usually does not manifest itself as a disorder, but rather a 'healthy' sense of fear of the significant changes of our climate (Clayton & Karazsia, 2020). This means that those who suffer from eco-anxiety generally do not need clinical treatment for it. Although people do not necessarily need treatment, it can be troublesome to experience anxiety or distress on a daily basis.

Past research on eco-anxiety is rather sparse. For the purpose of the current research, the study by Verplanken et al. (2020) is of particular relevance, because they investigated whether habitual worry about climate change, which is an important aspect of eco-anxiety, has a constructive or unconstructive effect on behaviour. Here, a constructive response is defined by motivated pro-environmental action, while an unconstructive response is defined by symptoms of pathological worry, or avoidance. Using online questionnaires, they carried out three studies to investigate this relationship. They found a positive correlation between climate worry and pro-environmental behavioural intentions.

Interestingly, Verplanken et al. (2020) found some nuance in this relationship; for some people worry about climate change was unconstructive, as it was associated with dysfunction. According to this research, unconstructive worry is also associated with cognitive and behavioural avoidance. So rather than taking action, people who worry in an unconstructive way will avoid the problem of climate change altogether. Contrarily, for others worry about climate change had a constructive effect, as it was associated with positive emotions such as hope and determination. In other words, this type of worry can lead to a more adaptive behavioural pattern, for example taking action to fight climate change by buying clothes secondhand. These findings indicate a complex relationship between worry and the behavioural response to worry about climate change (Verplanken et al., 2020).

The current research will investigate this relationship further, and will focus on self-reported eco-anxiety as a whole, not just worry about climate change. Eco-anxiety does include worry, but it is a wider term that also encompasses self-reported emotional and mental distress and behavioural issues (Hogg et al., 2021). I will investigate how self-reported eco-anxiety relates to action intentions to mitigate climate change.

Collective and Individual Action

A way to fight the devastating impacts of climate change is collective action. *Collective action* is a key component of societal change; it can be defined as taking action, as a collective, to improve the status, power or influence of a group (Van Zomeren et al., 2008; Van Zomeren & Iyer, 2009). Collective climate activism takes shape in different ways, such as political demonstrations, hanging up posters, handing out flyers, and signing petitions (Van Stekelenburg & Klandermans, 2013; Van Zomeren & Iyer, 2009). A very well-known example of a collective climate movement is Fridays for Future by Greta Thunberg, which started in 2018. Their main form of collective action was to gather in the streets to demand climate justice.

However, action against climate does not always have to take place in groups (Wang et al., 2021); there are things that an individual can do to mitigate climate change, such as consuming less meat, cycling to work instead of taking the car, or buying things secondhand (Fisher & Nasrin, 2021). For the current research, the term collective action will refer to action that takes place in groups, like the Fridays for Future gatherings, while the term individual action will be used when discussing actions done on a personal level.

Humour

A commonly used tool in the fight against climate change is humour. For instance, banners with memes about climate change are a common occurrence at Fridays for Future gatherings. The current research will investigate how different types of humour affect the intention to take collective action. At first glance, it may seem counter-intuitive to investigate the use of humour in the fight against climate change. Undoubtedly, climate change is one of the most serious threats to human life there has ever been (IPCC, 2022); so joking about

such a delicate topic may feel counterintuitive. However, historically, humour is a common tool used in social protest to communicate discontent and injustice (Hart, 2007; Hee et al., 2022). A broadly researched aspect of humour is its ability to persuade people to change their attitudes or behaviour. According to Kaltenbacher & Drews (2020), humour can cause more involvement in climate change action, even by those who are not particularly engaged in climate change action yet. On the other hand, disparaging humour might scare some people away by making them feel more excluded from the climate activist group. Other past research on the persuasive effects of humour has shown some contrasting effects. According to Walter et al.'s meta-analysis on this subject, "there is no general agreement about the role played by humour in persuasion." (2018, p. 345). Skurka et al. (2018) also conducted a meta-analysis. They focused on the influence of humour on climate action intentions and found that humour appeals can increase intentions to take environmental action. But the researchers added some nuance: they stated that humour might decrease intentions due to a reduction of fear and anger around climate change. Overall, these two meta-analyses paint a diverse picture on the effect of humour on behavioural intentions. The current research might be able to provide some clarity on the relationship between humour appeals, fear and climate activism intentions. To do this, two different types of humour will be used, namely disparaging humour and affiliative humour. Below these terms will be defined in more detail.

Disparaging humour is a humour type that is meant to be amusing by making fun or belittling others (Ferguson & Ford, 2008; Hatzithomas et al., 2021). Disparagement humour is distinguishable from other types of humour because it attacks its targets. Some researchers claim that it is not possible to defend oneself against disparagement humour, because it is not socially accepted to respond to a joke in a serious manner (Ferguson & Ford, 2008). In the current research, the disparagement humour will be targeted at those who do little to nothing to act pro-environmentally. In other words, the humorous cartoons used in the disparaging condition will make fun of people who are inactive in fighting climate change.

In addition to disparaging humour, the current study will use affiliative humour. Affiliative humour is different from disparaging humour as this type of joke is typically considered funny by most people. Rather than degrading others, affiliative humour can be used to strengthen

bonds among groups of people and reduce interpersonal stress (Cann et al., 2016). Thus, where disparaging humour can separate people, affiliative humour can bring people closer together. The current research will compare the effects these two types of humour have on behavioural action intention, collective and individual.

The Current Research

The current research will investigate what the influences of disparagement humour and affiliative humour are on collective and individual climate action intention. Additionally, the relationship between eco-anxiety and collective and individual climate action intention will be explored.

Firstly, it is hypothesised that those assigned to the affiliative humour condition will report greater intentions to take climate action than those experiencing the disparagement humour (H1). An explanation for this difference is that, in contrast to disparagement humour, affiliative humour has the power to bring people together (Cann et al., 2016). Feeling a sense of belonging to a group that tries to mitigate climate change together might persuade people to take action. Being exposed to targeted disparaging humour might do the opposite of bringing people together; it might only scare inactive people away from climate change action.

Secondly, it is hypothesised that eco-anxiety will positively correlate with the intention to take climate action (H2). This means that those with higher eco-anxiety scores will also have a greater intention to take climate action and vice versa. However, as described above about Verplanken et al. (2020)'s study, this relationship might not be completely straightforward; some people experiencing high eco-anxiety might have an unconstructive response, taking shape as cognitive and behavioural avoidance. Even when considering these nuances, overall, a positive correlation between eco-anxiety and activism intention is expected.

In line with H2, it is hypothesised that the positive relationship between eco-anxiety and action intention will be stronger in the disparaging group than in the affiliative group (H3). The most obvious explanation for this interaction effect is the fact that seeing disparaging humour might heighten the level of self-reported eco-anxiety, which in turn will heighten the intention to take climate action. The affiliative humour condition might show an opposite

pattern; affiliative humour might make people feel like they belong in a tighter social group. This might then decrease the level of eco-anxiety in this condition. Therefore, it is hypothesised that those in this condition will report less anxiety, and consequently report a lower level of intention to take climate action.

Method

Individual Note

The data collection for this research is conducted by six students for their individual bachelor theses. As the individual theses all differ, different variables have been added to the questionnaire described in the method section, that will not be used in the current research. In this research, I will be focusing on humour types, disparaging and affiliating, collective action intention and individual action intention, and self-reported eco-anxiety.

Participants and Design

In this research, the effect of humour on various variables will be researched, and therefore we designed an experiment in which humour is the independent and manipulated variable. To gather data, a convenience sample was used; each participant of this research was contacted directly via the social network of the researchers or other participants (snowballing) to participate in the research. This happened either online (via social media) or in person. No inducement for participation was provided. The participants were semi-randomly assigned, using the 'evenly present elements' tool Qualtrics provides, to one of the two experimental conditions: either three cartoons of disparaging humour or three cartoons containing affiliative humour. An a priori analysis using a program called GPower showed that a sample size of 400 participants is required for an analysis of variance to be statistically significant, with a medium effect size ($f = .25$) and a power of .95%.

In this study 427 participants took part, with an average age of $M = 30.91$ ($SD = 14.42$, $range = 18-87$). Out of all the participants, 59.8% said to identify as female and 38.20% as male. Six people said to identify as a third gender or preferred not to say. Most participants described their living environment as more urban (on a scale from 1= *completely rural* to 7=

city center, $M = 4.98$, $SD = 1.75$). The political preference of the participants were right skewed where most participants were more left-wing (on a scale from 0 = *extreme left* to 10 = *extreme right* $M = 3.51$, $SD = 2.08$).

Procedures and Materials

The questionnaire was provided in three different languages (English, Dutch, and German) to increase the possibility of response. The respondents could choose their preferred language. It was filled out in Dutch by 151 participants, 80 people filled it out in German and 75 in English. All items were translated to German and Dutch from English, using the back-translation procedure (Van de Vijver & Leung, 1997). In this procedure, one researcher translated the questionnaire from English to either Dutch or German, and another translated this version back to English. Then these two English versions were compared, to conclude whether the translation was adequate. The questionnaire started with an informed consent form in which it was described that people's perceptions of climate change and cartoons about this topic were of interest for this research. An overview of the complete questionnaire can be found in Appendix A.

Humour Manipulation

To investigate the effects of humour, each participant saw cartoons that either were: 1) disparaging: making fun of people who do not take climate change seriously, or 2) affiliative: making fun of climate change in general. This manipulation of humour style was reinforced by the instructions on how to use cartoons in research, adapted from Ford et al. (2017). Liking different humour styles is a personality variable, but can be activated externally; doing so ensures that the cartoon is interpreted in a way that is in line with the goal of the cartoon. The instructions were the following for the disparaging humour condition: "Think about climate change in a humorous way that makes fun of people who do not take climate change seriously. To help you with this, we want to give you 3 cartoons that make fun of people who do not take climate change seriously. As you think about debates and actions around climate change, use the cartoons as a way to humourously put people down who do not take climate

change seriously”. When they were put into the affiliative humour condition, participants were instructed to: “Maintain a humorous perspective when thinking about climate change. Try to find amusement in the absurdity of this whole situation of debates and actions around climate change. To help you make fun of this situation we want to show you 3 cartoons. As you think about debates and actions around climate change, use the cartoons to maintain a humorous, light-hearted outlook on the whole situation.”

The cartoons were found online via Google search, or social media platforms like Twitter and Instagram, and selected based on three main criteria. First of all, the disparaging cartoons had to focus on disparaging inactivity regarding climate change specifically, and not on climate change denial. Secondly, the affiliating cartoons could not disparage individuals in any way, and had to contain a light-hearted outlook on climate change. Lastly, all cartoons had to be politically neutral (e.g. not include political leaders and their actions).

Humour Manipulation Check

In the questionnaire an 8-item scale served as a manipulation check, to see how respondents felt after seeing the cartoons about climate change. The scale was rated on a 7-point Likert scale (1= *fully disagree*, 7 = *fully agree*) and included items such as: “The cartoons on the previous screen make me feel amused”; “The cartoons on the previous screen make me feel guilty” and “The cartoons on the previous screen make me feel ashamed”. The scale was retrieved from research by Thomas et al. (2020), and asked to what extent people felt amused, guilty, inspired, outraged, entertained, angry, empowered and ashamed. Based on concept, these eight items can be paired accordingly: amused and entertained (Spearman’s rank correlation, $r_s = .67$), outraged and angry ($r_s = .67$), guilty and ashamed ($r_s = .61$), inspired and empowered ($r_s = .44$).

Collective action behavioural intentions

After the manipulation check, respondents were asked to rate their intention to take collective action against climate change. Participants were asked how likely it is that they would participate, in the future, in the following behaviours concerning pro-environmental action

against climate change. The seven items in this scale describe different pro-environmental action behaviour, such as signing a petition, participating in a demonstration against climate change, or occupying a public building to protest against climate change. The 7-point Likert scale provided answer possibilities from -3 (*very unlikely*), to 3 (*very likely*). The internal reliability of the collective action intention scale (Cronbach's $\alpha = .77$) was sufficient.

Individual action behavioural intentions

The scale for individual behavioural intentions was based on a scale by Wang et al. (2021). The original scale consisted of 13 items, but for the sake of the length of the questionnaire, we decided to only select nine of them. Respondents were asked how likely it was that they would engage, in the future, in the following types of behaviours in their daily life. Items described individual behaviours like separating paper from waste, using paper economically, reusing shopping bags and picking up litter off the street. The nine items had the same scale of -3 (*very unlikely*) to 3 (*very likely*) as the collective action intention questions. The internal reliability of the individual behavioural intention scale was sufficient (Cronbach's $\alpha = .73$).

Eco-Anxiety

To allow the participants to familiarise with the term eco-anxiety, a short description of the term was provided: "The term 'eco-anxiety' is used to describe the mental and emotional distress an individual may experience in response to the threat of climate change and global environmental problems". After the description, participants were asked to what extent they experience eco-anxiety. This was on a scale of 0 (*never*) to 10 (*always*). This question was retrieved from the self-identified eco-anxiety dimension adapted from the Hogg Eco-Anxiety Scale (Hogg et al., 2021). The original scale has 13 items. However, research carried out on the self-identified dimension shows that people relate quite well to the term 'eco-anxiety'. To keep the questionnaire concise, it was decided to only use this self-identified eco-anxiety dimension.

Politicized Identity

To measure the political identification of the respondents, a single item identification is used next to a 12-point scale. The single item identification was “I identify with climate change activists” and the 12-point scale was rated on a 7-point Likert scale (1= *strongly disagree*, 7 = *strongly agree*) and included items such as: “I feel a distance between myself and climate change activists” (detachment scale); “I am (or would be) unhappy to belong to climate change activists” (dissatisfaction scale); “I have nothing in common with most climate change activists” (dissimilarity scale). Between the parentheses above is described which subscale these items belong to. The subscales are retrieved from 3 subscales from Leach et al. (2008)’s multicomponent model of in-group identification. The three subscales used are detachment, dissatisfaction, and dissimilarity. These specific subscales are selected, because research by Becker & Tausch (2014) has shown that these scales make a statistically significant distinction between non-identification and disidentification: respondents who score high on these scales and do not identify with the group are more often disidentifiers, and those who score low but also do not identify with the group are more often non-identifiers. Cronbach’s alpha were $\alpha = .88$ for the detachment scale, $\alpha = .90$ for the dissatisfaction scale, and $\alpha = .84$ for the dissimilarity scale.

Climate Change Skepticism

Climate change skepticism was measured based on a 7-point Likert scale using 6 items, where 3 of them measured people’s beliefs towards climate change, such as the belief that the climate is changing, that humans caused climate change, the belief that climate change is exaggerated, and another 3 measured the belief that humans can influence climate change, the belief that individuals can influence climate change and the belief that individuals together can contribute to climate change. This scale was adapted from a study by Christensen & Knezek (2015). Cronbach’s alpha was $\alpha = .80$ for this scale.

Demographic Variables and other Nominal Data

Lastly, the questionnaire focused on simple measures including demographic variables, but also extraversion, living environment and political orientation were measured in the following order.

Extraversion

First, the character trait '*extroversion*' was measured by a 7-point Likert scale ranging from '*strongly disagree*' to '*strongly agree*'. Participants were asked to indicate whether they liked to be around people and have excitement around them and whether they would consider themselves extroverted.

Age and Gender

Next, participants' age was measured by asking them to fill in their age in years. Subsequently, participants' gender identification was measured using five answer options: *male*, *female*, *non-binary/third gender*, *prefer not to say*, and an option for the participant to describe their gender themselves.

Living Environment

On the next page, the living environment was measured by asking participants to indicate how urban they think their living environment is based on a 7-point scale ranging from (1) '*rural*' to (7) '*city center*'. This question was based on the scale used by Brinkhof et al. (2022).

Political Orientation

Lastly, the participants' political orientation was measured using a scale by Gregersen et al. (2020). This scale defines political orientations in terms of 'left' and 'right'. The participants were asked to place themselves on a scale that ranged from (-5) *extreme left* to (5) *extreme right*.

Attention Check

The questionnaire also included an attention check. This was measured by asking participants once to fill in a specific answer: “Please fill in strongly disagree”.

Debriefing

After all the questions in the questionnaire, the last section of the questionnaire contained a debriefing section. In this section, participants were thanked for their participation, were told they were part of one of two conditions (disparaging or affiliating humour), and were asked to distribute the questionnaire via social media. If they had any questions or comments, they could provide them anonymously in the questionnaire, or e-mail the principal investigator supervising this research.

Results

Preliminary Analysis

Missing Data

Of the total of 427 participants, the data of 100 respondents could not be included in the analysis. Below, the reasons for exclusion are explained. Three participants did not consent to participate in the research, or the processing of their political orientation. Fifty-five participants stopped the questionnaire after filling out the consent questions. Twenty-four participants only filled in the questionnaire up until, and including, the eight manipulation check questions. There were 12 respondents who stopped answering questions at random spots throughout the survey. Lastly, six participants seemed to have randomly skipped through the survey without answering all the items.

Attention and Manipulation Check

After taking care of the missing data, the attention checks were dealt with. The 21 participants who failed to correctly answer this check were excluded from the analysis. The data was then screened for *straight lining*, where respondents give the same answer for almost

every questions in a scale; no suspicious answering was found. After taking care of the missing data and the attention check, the number of included participants was 306. For the manipulation check, responses on the amused and entertainment items was compared to the answering on the guilty, inspired, outraged, angry, empowered, and ashamed items. If the humour manipulation worked as intended, responding on the amused and entertained items would be significantly higher than on the other 6 items, independently of which group participants were in. Non-parametric tests were used to analyse the manipulation check, because normality could not be assumed for these 7-point items.

To minimise the number of necessary comparisons to investigate the effect of the manipulation the eight questions were grouped like described in the method section: amused and entertained (A & E), guilty and ashamed (G & A), inspired and empowered (I & E), and lastly, outraged and angry (O & A). Using four groups instead of eight reduces the chance of an erroneous finding caused by the multiple comparisons problem. The scores of these four pairs are the sum of the score on the two individual items.

Table 1, which can be found below, shows the medians (*Mdn*) and interquartile range (*IQR*) for these four pairs across the two humour conditions. It shows that the Amused and Entertained pair had the highest median in both conditions. Moreover, it shows that the medians of the A&E, G&A and O&A items did not differ across the two humour conditions. The median of the I & E items was one point lower in the affiliate humour condition than in the disparaging condition.

Table 1

Medians and IQR for Manipulation Check Pairs in Conditions

	Disparaging Humour Condition		Affiliative Humour Condition	
	<i>Mdn</i>	<i>IQR</i>	<i>Mdn</i>	<i>IQR</i>
A & E	10	4	10	3
G & A	8	4	8	5
I & E	9	3	8	3
O & A	7	7	7	5

A Wilcoxon matched pairs signed rank test was conducted to determine whether there were significant differences between the amused and entertained pair and the other three pairs. Again, a non-parametric test was chosen because the data were on an ordinal scale, and not normally distributed. The test indicated that the A & E pair was rated significantly higher than the G & A pair, $Z = -6.801$, $p = < .001$. The test indicated that the A & E pair was rated significantly higher than the I & E pair, $Z = -8.382$, $p = < .001$. Lastly, the test indicated that the A & E pair was rated significantly higher than the O & A pair, $Z = -9.261$, $p = < .001$.

To conclude, the A & E pair was ranked significantly higher than the other three pairs. This means our humour manipulation did partly work as intended: of the measured appraisals, entertainment and amusement were significantly the highest ranked. Interestingly, the other appraisals did not differ much across the two humour conditions.

Outliers

For the current research design, getting rid of outliers would be unjustified. This is because most of the items and scales included in this research are 7-point scales. Hence, scores cannot go below 1 or above 7, and extreme scores are thus impossible. Someone only answering with 1 does not necessarily indicate suspicious answering; these could also just be this person's true answers. One could even argue that 'extreme' answering, like 1 and 7, on a Likert-scale is incredibly informative data, and that it would be a waste to remove all this information.

Main Analysis

For the purpose of the main analysis the following variables were computed based on the data: the average of the seven collective action intention items, which will be referred to as the Collective Action Intention scale; the average of the nine individual action intention items, which will be referred to as the Individual Action Intention scale. These scales were averaged separately, as this might offer more insight into the differences between these two types of climate change action. To test H3, it was necessary to also combine the Collective Action Intention scale and the Individual Action Intention scale into one overarching Action Intention Scale. This was done by computing the average. Lastly, because eco-anxiety was measured

using only one item, this variable was left as is.

Kolmogorov-Smirnov tests of normality were conducted to determine whether the data of these four scales follow a normal distribution. The distributions were significantly non-normal for the Collective Action Intention scale ($D(306) = 0.058, p = 0.016$), the Individual Action Intention scale ($D(306) = 0.110, p = < .001$), and the Eco-Anxiety scale ($D(306) = 0.129, p = < .001$). The distribution was normal for the combined Action Intention scale ($D(306) = 0.031, p = 0.200$). Based on these outcomes, assuming normality would be unjustified for the Collective Action, Individual action and the Eco-anxiety scales. Normality can be assumed for the Action Intention scale, but to keep things consistent, the current analyses uses non-parametric tests.

Hypothesis 1

To start, it is hypothesised that the participants assigned to the affiliative humour condition will report larger intentions to take climate action than those in the disparaging humour condition. To test this hypothesis, a Mann-Whitney U test was conducted to compare the collective action intention for both groups, and the individual action intention for both groups. This revealed that the collective action intention was not significantly greater for the disparaging humour group ($Mdn = 3.57$) than for the affiliative humour group ($Mdn = 3.29$), $U = 10876.00, z = -.98, p = .329$. Furthermore, the Mann-Whitney U test revealed that the individual action intention was not significantly greater for the disparaging humour group ($Mdn = 5.67$) than for the affiliative humour group ($Mdn = 5.56$), $U = 10298.50, z = -1.73, p = .084$.

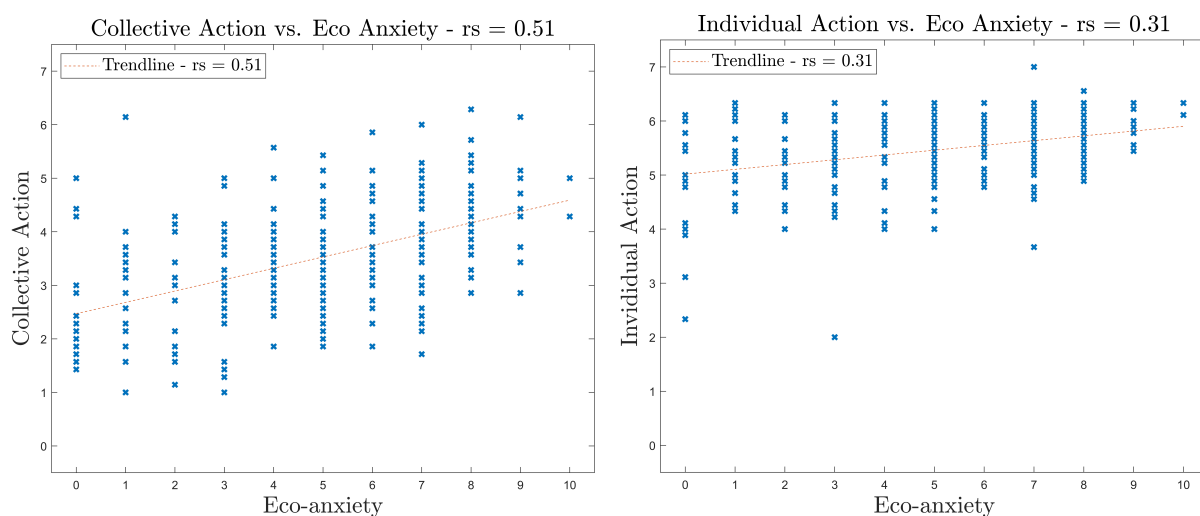
Hypothesis 2

Secondly, it is hypothesised that eco-anxiety will positively correlate with the intention to take climate action (H2). Spearman's rank correlation was computed to assess the relationship between the Eco-Anxiety scale, the Collective Action Intention scale and the Individual Action Intention scale. Spearman's rank correlation was chosen, rather than another correlation test, because the data was non-normal; the Eco-Anxiety scale was strictly ordinal (0, never, to 10, always); and the assumption of a monotonic relationship was met.

The Spearman’s rank correlation revealed that there is a significant positive correlation between Eco-Anxiety and Collective Action Intention $r_s = 0.51, N = 306, p = < .001$. Based on *User’s guide to correlation coefficients* written by Akoglu (2018) this correlation is considered moderate. Similarly, there was a significant positive correlation between Eco-Anxiety and Individual Action Intention, $r_s = 0.31, n = 306, p = < .001$. Based on Akoglu (2018) this correlation is considered weak. Figure 1 gives a visual representation of the found correlations.

Figure 1

Spearman’s Rank Correlations for Collective Action, Individual Action and Eco-Anxiety



Hypothesis 3

Lastly, it is hypothesised that the relationship between eco-anxiety and action intention will be stronger in the disparaging group than in the affiliative group. To test this interaction, Spearman’s rank correlations were compared. ¹ Here, the overarching Action Intention scale was used to make things less convoluted. First, the Spearman’s rank correlation was computed between Eco-Anxiety and Action Intention for the two humour conditions. There was a significant positive correlation between Action Intention and Eco-anxiety for the disparaging humour condition, $r_s = .49, n = 154, p = < .001$. There was also a significant positive correlation between Action Intention and Eco-anxiety for the affiliative humour condition, $r_s = 0.61, n = 151, p = < .001$

¹Although a mediation analysis would be better suited for the current research, this statistical technique is not part of the curriculum. Therefore, a comparisons of Spearman’s rank correlations was conducted. Results must be interpreted with caution.

To compare these two correlations, and find out whether the difference between them is statistically significant, the correlation comparison formula for two samples was used (Eq. 1).

$$Z_{obs} = \frac{Z_1 - Z_2}{\sqrt{\frac{1}{N_1-3} + \frac{1}{N_2-3}}} \quad (1)$$

The results show an insignificant difference between the correlation of eco-anxiety and action intention in the disparaging group and in the affiliative group ($z = -1.49, p = 0.067$).

Discussion

Implications

The first objective of the current research was to investigate the effect of two humour types, disparaging and affiliative, on the intention to take action against climate. The second objective was to explore the relationship between eco-anxiety and climate action intention.

Because affiliative humour can bring people together, it was hypothesised that those assigned to the affiliative humour condition would report greater intention to take action against climate change (H1). The findings do not support this hypothesis; no significant difference was found in collective and individual action intention between the affiliative and disparaging humour condition. Although no support for our hypothesis was found, these findings add to the scientific knowledge about the effects that different types of humour have on action intention. As described by Kaltenbacher & Drews (2020) and Walter et al. (2018) most research does not make comparisons between different types of humour. The current research is therefore unique; it attempted to scientifically establish how different types of humour affects climate action intention.

Our next hypothesis (H2) was that eco-anxiety would positively correlate with collective and individual action intention. The findings support this hypothesis; the two correlations values were both significant, alluding to a constructive, pro-environmental response rather than an unconstructive and avoidant response. These findings add more insight to the complex relationship found by Verplanken et al. (2020); they concluded that people who worry a lot about climate change either had a constructive or unconstructive response. However, due to

the correlation nature of the test, no causal claims can be made regarding these outcomes. To establish such a causal relationship, further research is necessary.

The last hypothesis (H3) was that the correlation between eco-anxiety and climate action intention would be significantly stronger in the disparaging group than in the affiliative group. The findings did not support this third hypothesis. The correlation was actually stronger for the affiliative group, but the difference with the correlation for the disparagement group was found to be insignificant. This means that the two humour conditions did not significantly influence the correlation between eco-anxiety and climate change action intention.

As described above, the findings were not supportive of the first and the third hypothesis. An explanation for both of these insignificant results might be that the manipulation was not powerful enough due to too much similarity between the two humour conditions. Our manipulation check established that participants found the cartoons funny, but little to no differences were found in the responses to the manipulation check questions between the disparaging group and the affiliative group. This might mean that manipulation did not fully work as intended; for example, disparaging humour did not make people feel angry, and affiliative humour did not make people feel inspired. Instead, participants in these two groups had very similar responses to the two humour types. If the manipulation conditions were so similar, it is not surprising that the different types of cartoons did not differ in their influence on the intention to take action against climate change.

Strengths and Weaknesses

In this section, the current research will be evaluated, and strength and weaknesses will be discussed. This might also further explain why there are discrepancies between the hypotheses and the results, and point in a direction for future research.

The primary strength of this research was the fact that it compared different types of humour. As described above, this is something that is lacking in past literature on humour. Second of all, a strength was that the sample size was relatively large, which makes the margin of error small. With an age range from 18 tot 87, the sample was also quite age-diverse, which is beneficial for the external validity of the study. Furthermore, the study managed to achieve

a strong construct validity for the two measures of action intention; the two scales were both based on past research, thus they were previously validated. Lastly, another strong aspect of this study was the attention check that was used. With this, it was certain that participants randomly filling out the questionnaire were excluded from the analysis, which was beneficial for the quality of the data.

By all means, this study also had some weaknesses. First, the sample showed bias for a few measured variables. For instance, the political orientation distribution was particularly skewed to the right, indicating a relatively left-wing sample, and most people reported that they lived in a city. These biases might have influenced the results and makes the generalisability of these findings limited. Furthermore, the construct validity of the eco-anxiety scale was debatable. Because it only contained one question from an existing 13-items scale, it is uncertain to what extent this one item was able to successfully measure the wide concept of eco-anxiety. Additionally, it is important to note that the study did not include a control group or no-treatment group. Because we only had conditions that contained humour, it can not be established if the differences are due to the humour conditions, or other factors. As described in the beginning of the results section, quite a lot of participants had to be removed from the data set; this is another weakness of this study. It is possible that a certain type of people, for example those inactive in climate action, were less likely to finish the questionnaire. This type of person would then systematically be included less in the data set, which can subsequently skew the results.

Future Research

The current research was unique, as it compared the effects of different types of humour, but it did leave unanswered questions. For example, it is unclear if disparaging humour has a different effect on action intention that affiliative humour does. Furthermore, it is unclear which way the relationship between eco-anxiety and action intention goes: does a higher level of eco-anxiety lead to a larger intention to take climate action, or is it vice versa? For a clearer image, it is essential that a no-treatment group is included in the design of future research. This will allow research to make stronger causal claims. More research is also needed to

further solidify the relationship between eco-anxiety and climate action intention. For this, it would be recommended to use a more in-depth scale to measure eco-anxiety, rather than only one self-report items which is very sensitive to misunderstandings. One can predict that eco-anxiety causes greater action intentions, rather than the other way around. Based on these future research suggestions, it is possible find a scientifically supported application of humour in the fight against climate change and subsequently, eco-anxiety.

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Appendix A

11-01-2023 13:16

Qualtrics Survey Software

English ▼

Informed consent

Information about the research PSY-2223-S-0137 THESIS Climate change cartoons

Why do I receive this information?

We invite you to participate in this research, because we investigate people's perceptions of climate change and cartoons about this topic. **Anyone who is at least 16 years old can fill out this questionnaire, regardless of your thoughts and opinions about climate change.**

This research was cleared by the ethics committee of behavioural and social sciences at the University of Groningen. The research is carried out by Mieke André, Suzanne Hofsteenge, Lucie Robbers, Clara Schwerdt, Claire Vermin, and Puck Wierda as part of their bachelor theses in psychology at the University of Groningen. This research is supervised by Dr. Hedy Greijdanus (principal investigator: H.J.E.Greijdanus@rug.nl).

Do I have to participate in this research?

Participation in the research is voluntary. However, your consent is needed. Therefore, please read this information carefully. You can ask any questions about this study now, during the research, and afterwards by sending an e-mail to H.J.E.Greijdanus@rug.nl. If you decide not to participate, you do not need to explain why, and there will be no negative consequences for you. You have this right at all times, including after you have consented to participate in the research. However, because **data collection is anonymous**, submitted responses cannot be retracted.

What do we ask of you during the research?

We now first ask you for your consent to participate in this research. Then you will be shown 3 cartoons and you complete a brief questionnaire about your perceptions and feelings of these cartoons and climate change. The research will take approximately 10 minutes.

Why this research? What are the consequences of participation?

By participating in this research you can contribute to scientific knowledge on the ways in which people think about climate change and cartoons about this topic.

How will we treat your data?

Data will be processed for education purposes, and anonymous / aggregated data may be used for scientific publication. **No personal data will be collected.** Your responses to questions about political orientation are considered **sensitive information**. Your responses in the entire study will be **anonymous**. Because we can't trace your responses back to individual persons, you cannot obtain a copy, correct, or withdraw your data once you have submitted it. The anonymous data may be made reusable after the end of the project (to people or institutions outside of the research team) for scientific purposes. The principal investigator is responsible for proper data storage and sharing.

What else do you need to know?

For **questions or concerns regarding your rights as a research participant** you may contact the Ethics Committee Psychology of the University of Groningen: ecp@rug.nl. For **questions or concerns regarding your privacy** you may contact the Data Protection Officer of the University of Groningen: privacy@rug.nl

As a research participant, you have the right to a copy of this research information. You can take a screenshot, using the Print Screen button or your smartphone camera.

Do you consent to participate in the research?

- Yes.
- No. *You will be directed to the end of this survey.*

Do you consent to the processing of your sensitive information, as described in the study information?

- Yes, I consent to the processing of my political orientation.
- No, I do not consent to the processing of my political orientation. *You will be directed to the end of this survey.*

Disparaging condition

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Carefully read these instructions:

Please think about climate change in a humorous way that makes fun of people who do not take climate change seriously. To help you with this, we want to give you 3 cartoons that make fun of people who do not take climate change seriously.

As you think about debates and actions around climate change, **use the cartoons as a way to humorously put people down who do not take climate change seriously.**

Reminder: As you think about debates and actions around climate change, **use the cartoons as a way to humorously put people down who do not take climate change seriously.**

Cartoon 1/3:



Reminder: As you think about debates and actions around climate change, **use the cartoons as a way to humorously put people down who do not take climate change seriously.**

Cartoon 2/3:

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Reminder: As you think about debates and actions around climate change, **use the cartoons as a way to humorously put people down who do not take climate change seriously.**

Cartoon 3/3:



Non-disparaging condition

Carefully read these instructions:

Please maintain a humorous perspective when thinking about climate change. Try to find amusement in the absurdity of this whole situation of debates and actions around climate change. To help you make fun of this situation we want to show you 3 cartoons.

As you think about debates and actions around climate change, **use the cartoons to maintain a humorous, light-hearted outlook on the whole situation.**

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Reminder: As you think about debates and actions around climate change, **use the cartoons to maintain a humorous, light-hearted outlook on the whole situation.**

Cartoon 1/3:



Reminder: As you think about debates and actions around climate change, **use the cartoons to maintain a humorous, light-hearted outlook on the whole situation.**

Cartoon 2/3:

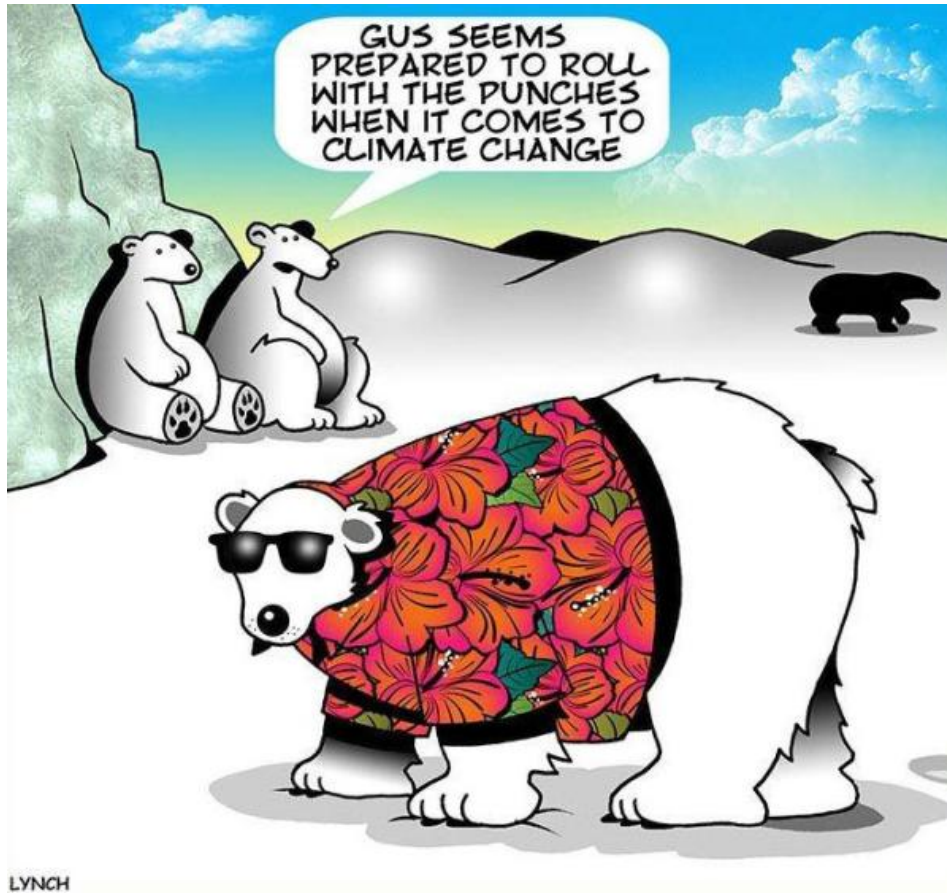


Reminder: As you think about debates and actions around climate change, **use the cartoons to maintain a humorous, light-hearted outlook on the whole situation.**

Cartoon 3/3:

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Manipulation Check / Affective reactions

The 3 cartoons on the previous screens make me feel...

...amused

...guilty

...inspired

...outraged

...entertained

...angry

...empowered

...ashamed

Behavioural intentions

How likely is it that you would participate, in the future, in the below behaviours concerning pro-environmental action against climate change?

Take some time to educate myself on pro-environmental action and what it stand for/wants to achieve

Share a social media post supporting pro-environmental action

Share a social media post against pro-environmental action

Sign a petition for pro-environmental policies

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- Participate in a demonstration against climate change
- Occupy a public building to protest against climate change
- Threaten the people who are most responsible for climate change

How likely is it that you would engage, in the future, in the below types of behaviours in your daily life?

- Separate paper from my waste
- Recycle glass
- Use paper economically
- Turn off the tap when washing dishes
- Prefer products with less packaging
- Use my own bag when shopping
- Throw litter on the street
- Pick up the litter when seeing it on the street
- Encourage others to recycle

Eco Anxiety

The term 'eco-anxiety' is used to describe the mental and emotional distress an individual may experience in response to the threat of climate change and global environmental problems.
To what extent do you experience eco-anxiety, on a scale from 0 (never) to 10 (always)?



politicized identity

- I identify with climate change activists
- I feel a distance between myself and climate change activists
- I feel detached from climate change activists
- I feel alienated from climate change activists
- I am (or would be) unhappy to belong to climate change activists
- I regret (or would regret) belonging to climate change activists
- Fill in strongly disagree - this is an attention test
- I wish I had nothing to do with climate change activists
- Being a part of climate change activists gives (or would give) me a bad feeling
- I have nothing in common with most climate change activists
- I'm dissimilar to the average climate change activist
- I'm completely different from other climate change activists

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climate skepticism

You're almost done with the survey!

- I believe our climate is changing
- Human activities cause global climate change
- I think most of the concerns about environmental problems have been exaggerated
- I believe that humans, together, can influence climate change
- I believe that I, as an individual, can influence climate change
- I believe that I, as an individual, can provide an important contribution so that humans, together, can influence climate change

Demographic questions

You have reached the final questions.

- I like to be around people and have excitement around me
- I would consider myself extraverted

What is your age (in years)?

What is your gender?

- Male
- Female
- Non-binary / third gender
- I would prefer to specify myself:
- Prefer not to say

How would you characterize your living environment?

Completely rural | | City center

In politics people sometimes talk of 'left' and 'right.' Using these indications, where would you place yourself on this scale?

Extreme left											Extreme right
-5	-4	-3	-2	-1	0	1	2	3	4	5	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

debriefing

Thank you for participating!

Your participation hopefully helps us to understand people's perceptions of climate change and cartoons about this topic. We are particularly interested in whether and how different forms of humour in cartoons influence people's thoughts, feelings, and behaviours concerning climate change.

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Deception

To investigate the effects of humour, each participant saw cartoons that either: 1) make fun of people who do not take climate change seriously, or 2) make fun of climate change in general. The cartoons were selected for the current research. This enables us to investigate how these 2 forms of humour affect people's ways of thinking and behaving around climate change.

Help us

We need more participants, if you want to help us you can copy and distribute the link to this questionnaire via social media such as Facebook, Instagram, or Whatsapp: https://bit.ly/BT2223_1a

Thanks, we really appreciate it! :)

More information?

If you want to receive the results in due time or have any other questions, please e-mail the principal investigator supervising this research, Dr. Hedy Greijdanus (h.j.e.greijdanus@rug.nl).

Do you have any comments?

Data collection is anonymous, so do not provide details that can identify you.

No

Yes: