Psychology of Aesthetics, Creativity, and the Arts

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Does Activist Art Have the Capacity to Raise Awareness in Audiences?—A Study on Climate Change Art at the ArtCOP21 Event in Paris

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The goal of this study was to investigate whether activist art can have a stimulating psychological effect on its spectators. This question is examined in art specifically related to climate change. With the aim of inspiring public engagement and communicating environmental issues to spark a climate change movement, ArtCOP21 is a global festival that took place simultaneously to the United Nations climate change negotiations (Conference of the Parties [COP21]) 2015 in Paris. Eight hundred seventy-four spectators responded to a questionnaire on their perception of 37 selected artworks. In an explorative study using cluster analysis, characteristics of the artworks were connected with emotional and cognitive audience responses. The analysis of the artworks assigned them to four clusters: "the comforting utopia," "the challenging dystopia," "the mediocre mythology," and "the awesome solution." As suggested by the name, the "awesome solution" was the cluster of artworks that caused the highest emotional and cognitive activation. Artists and environmental campaigners can use the commonalities of the artworks in this cluster in their own creative work and contribute to our understanding of the impact of activist art.

Keywords: activist art, visual art, environmental psychology, emotions, cognitions

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Becoming particularly prevalent in the last 10 years, activist art has aimed to change the world by inspiring people to action against societal problems (Nurmis, 2016). One such problem is global climate change. In climate change research, the question whether change is indeed happening and has anthropogenic causes is hardly debated anymore (IPCC 2014a). Communication of environmental issues and climate change has not led to the necessary level of public engagement (Nisbet, 2009). Several reasons have been proposed for this lack of success; Moser (2010) gives a comprehensive overview of the challenges environmental communicators face. One reason is that climate change is a complex phenomenon that requires knowledge and understanding from several fields and perspectives (Dunaway, 2009). Another is that mitigating climate change entails long-term planning and decision making, while individuals tend to make short-term decisions (Weber, 2006). Furthermore, the inequality of climate change lies not only on the temporal but also on the geographic scale, since the actions that cause climate change are still mostly allocated in the economically strong, developed countries. The effects, however, are appearing in the developing countries through severe changes in local climates, which is often combined with a lack of resources to adapt (IPCC, 2014b; Kirkman, 2007). An effective way of creating engagement needs to address these challenges. For example, cognitive factors have the potential to eventually influence people's behavior by finding an emotional link to climate change. However, until now, most communication and engagement campaigns have been informational and based on the assumption that people only have to be educated about the risks of climate change to start acting (Corner & Groves, 2014; Rayner & Minns, 2015).

Cultural aspects and alternative ways of framing climate change are rare (Boulton, 2016; Hulme, 2009). Some researchers suggest that a solely fact-based approach to communication will not lead to behavioral change and is therefore not enough to raise public awareness and create engagement (Blake, 1999; Boulton, 2016; Nisbet, 2009). Alternative strategies could, however, tap into the creative potential of societies, be culturally engaging, and contribute to imagining a new and better future for humankind (Curtis, Reid, & Ballard, 2012; Hulme, 2009; Marks, Chandler, & Baldwin, 2014; Nurmis, 2016). In fact, in recent years an increasing number of artists have responded to the issue of global climate change through their work (Nurmis, 2016). This makes climate change an interesting arena for studying the psychological effects that activist art might have on people.

The arts have been an important element in activism in many political fields (Belfiore & Bennett, 2006). Subcultures have, for example, used the arts and fashion as a way of resisting the dominating culture of the mainstream. Art creates meaning, and functions as a tool for and protest movements and the expression

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of dissent (Belfiore & Bennett, 2006; Jackson, 2016). In the 1960s, the visual arts were an influential element used to protest against the establishment and express the controversial beliefs of a generation aversive to propaganda (Clark, 1997). While climate change art is a good example of this tradition, it surpasses subculture in addressing culture as a whole. As the founder of the climate art organization, Cape Farewell, David Buckland, phrased it: "Climate is culture" (Buckland, 2012).

Environmental activism through art serves thus as a case of "activism through art" in this study, with which we aim to examine the effect activist art has on its audience. Environmental artists have risen to the challenge to address climate change. Nurmis (2016) outlines how climate change art has established itself as a genre that has developed alongside, but separate to, environmental activism. She makes the claim that such art can convey cultural meaning to global warming beyond the current reach of scientific discussions and political discourse.

In the present paper, we propose that environmental psychological theory can assist in determining through which psychological mechanisms climate change art affects audiences, and guide artists who care about the impact of their work. In the following sections, we first connect psychological aesthetics, environmental psychology, and environmental art. Thereafter, in the Method section, a questionnaire study conducted at the environmental arts festival ArtCOP21 is presented. The ArtCOP21 took place parallel to the United Nations (UN) Climate Change Conference (Conference of the Parties [COP21]), in November/December 2015, in Paris. Data were collected at 37 artworks that were part of ArtCOP21. In the Results section, a cluster analysis is presented based on the emotional profile they evoke in their audience. This technique empirically groups artworks, which share similar profiles of psychological responses of the visitors to the artworks. Afterwards, the resulting artwork clusters are studied further with respect to their profile in other variables not used for the clustering. The results are then discussed based on the psychological theory presented in the introduction; recommendations are given for environmental artists and campaigners, followed by concluding remarks in the final section.

The Psychology of Aesthetics

The psychological processes underlying the perception of art are subject to interdisciplinary fields, called psychology of art, experimental aesthetics (psychology of aesthetics), and neuroaesthetics (Joshi et al., 2011). The fields have their origin in the 19th century, when Fechner proposed a bottom-up concept of aesthetics and adopted a wider concept of beauty. Something was "beautiful" if it caused a feeling of "liking" (Fechner, 1871). Thereby, Fechner put emotional responses in the focus of his research, which has been followed by many other researchers in the psychology of aesthetics (Joshi et al., 2011; Pelowski, Markey, Lauring, & Leder, 2016; Vessel, Stahl, Maurer, Denker, & Starr, 2014; Vessel, Starr, & Rubin, 2012).

A number of studies in the empirical aesthetics were conducted outside of the laboratory, in order to capture and compare real art experiences and museum settings with their reproductions in the laboratory (Brieber, Nadal, & Leder, 2015; Locher, Smith, & Smith, 1999, 2001; Pelowski et al., 2018; Specker, Tinio, & van Elk, 2017). In a real-life setting, most features of art are difficult to define and even more so to manipulate in a controlled way. In line with this fieldwork, we are not interested in investigating the psychological impact of one specific characteristic of an artwork on the spectators. Rather, we aim to find commonalities in environmental artworks and relate them to emotional and cognitive variables that have been shown in environmental psychological research to be relevant as predictors of environmentally friendly behavior. Therefore, data was collected in the field on a larger range of pieces of art, making this a very exploratory study. There is much to be gained from such research, especially for campaigners against climate change, creative practitioners, and politicians interested in bringing change to their community.

Environmental Psychology, Behavior, and Art

Several factors have been identified by environmental psychology to be relevant for motivating environmentally friendly behavior. So far, mostly in Australian studies, variables from environmental psychology have been connected with climate change-inspired art. Researchers investigated the effect of different forms of environmental art on their audience (Curtis, 2009, 2010, 2011; Curtis, Reid, & Reeve, 2014; Marks, Chandler, & Baldwin, 2017). Based on their findings we derived psychological variables which we assume to be triggered by environmental artworks. Environmentally relevant variables triggered by art are listed in the Method section and in Table 2.

The first set of psychological variables we focus on are emotional reactions triggered by the experience of an artwork. A study on an environmental theater performance found that the performance inspired a "rich emotional response" (Curtis, 2010). Curtis further found these emotions to contribute to community building, environmental awareness, and environmentally friendly behavior. Taken together with the emphasis on emotions in the psychology of aesthetics, we assume that emotional reactions can be key in making climate change personally relevant to people and may be an important driver of change. Emotions, such as happiness, have also shown to promote intrinsic motivation and interest, and thereby contribute to create engagement (Fredrickson, 2013; Fredrickson & Joiner, 2018; Storbeck & Wylie, 2018). Interestingly, Weber (2006) concludes that our actions against climate change are limited, partly because we lack an emotional connection to the topic. We therefore expect that an important mechanism by which activist art affects people is emotional activation, whether positive or negative. Following the suggestion by Silvia and colleague (Silvia, 2009; Silvia & Brown, 2007) to diversify the research on emotions in psychological aesthetics, we also included measuring a set of different emotions such as, for example anger, guilt, hope, and surprise into our study.

Apart from emotions, cognitive responses can be triggered by art experiences (Silvia, 2005) and can become relevant as determinants for environmental behavior. Cognitions and emotions do not exist separate from each other and the order in which they are triggered is often hard to define. The appraisal theory of emotions connects emotions with consequent cognitions through a process called "appraisal" (Moors, 2018; Moors, Ellsworth, Scherer, & Frijda, 2013). According to this theory, the occurrence and variety in emotions are determined by the interaction between a perceptual stimulus and the person's expectation, goals, the number of available options to act, and the source of the stimulus. In the case of

art, a shocking piece of visual art can, for example, cause people to react with anxiety, anger, or guilt, dependent on their personal background and state. Thereby, emotions can be conceived as episodes, which change cognitive processing ("What does this artwork mean/tell me?"), motivational aspects ("Does the artwork motivate me to a certain action?"), physiological reactions (sweat, chest tightness, etc.), and maybe even actual behavior ("I will cycle to work tomorrow"). To conclude, we expect that emotions have a key role in the activating process.

Climate change-related cognitions can be of many different kinds. Hulme (2009) argues that climate change is not just a physical entity that shapes our present and future weather conditions, but also holds meaning for culture. Making culture and climate interact "and mutually shape each other" thereby triggers contemplation and reflection in people. Art can, for example, make people aware of the impact of their own behavior (Marks et al., 2017) and reflect on their role within climate change (Curtis et al., 2014). Other studies investigated the impacts of art on raising awareness for environmental issues (Curtis, 2011), creating empathy for ecological restoration (Curtis, 2009) and mobilizing communities to achieve sustainability (Curtis, 2006).

Moreover, art can illustrate to people why environmental topics are relevant for them in their daily lives, without sounding "preachy" (Neal, 2015, p. 18). Thereby engagement can be created, when people care about climate change and feel that it is in their range of actions to make changes in their behavior (Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007).

In 2014, Curtis et al. published an overview and summary of their studies and major findings (Curtis et al., 2014). Drawing on research about values, beliefs, and attitudes (Stern, Dietz, Abel, Guagnano, & Kalof, 1999; Triandis, 1979), Curtis theorizes that since these variables have been identified to influence proenvironmental behavior (Kollmuss & Agyeman, 2002), and the arts have been shown to impact just these variables (Belfiore & Bennett, 2006), art can function as a driver for environmentally friendly behavior. He continues in a similar way for several other variables, including awareness of consequences, environmental self-identity, habit, and social norms. Based on 10 studies he conducted on a diverse set of environmental art festivals, performances, and art exhibitions, seven key findings emerged. His results were that art experiences help to:

(a) improve proenvironmental beliefs, values, and attitudes;

(b) raise awareness of the consequences of certain actions;

(c) form a proenvironmental self-concept;

(d) unfreeze ingrained habits;

(e) form proenvironmental social norms;

(f) build community involvement in proenvironmental activities; and

(g) reduce some situational constraints and physical barriers to adopting pro- environmental behavior.

Audience's Perception of the Artist

Even if the artwork can be perceived on its own, visitors also make inferences about the artist when engaging with the artwork. In a few of the artworks studied in this paper, the artist was present when it was viewed. If you furthermore assume that a piece of work is also judged in relation to who created it and (non)-identification with the creator of a work will change how a work is perceived, perception of the artist is another important factor to address. Based on findings by White, Kaufman, and Riggs (2014), we were interested in whether the way spectators saw the artist differed across types of artworks (as clustered by their emotional profile). Even though there is plenty of research on how artists perceive the world (Perdreau & Cavanagh, 2013; Vogt & Magnussen, 2007), there is very little research on how people perceive artists. By including five items on how the artist is being perceived, we want to contribute to this aspect of the impact of environmental art.

Research Questions

To summarize, in our study we investigate the effect of activist art, in the form of environmental artworks, on their spectators. Environmental art is defined as artworks having the topic of or depicting environmental problems, such as climate change. The audience reaction is measured in three categories: (a) the emotional profile elicited by the artwork (which is the input for the cluster analysis), (b) the cognitive assessment triggered by the emotional activation and perception of the artist, and (c) the characteristics of the artwork itself (such as materials used, size, technique, etc.) as assessed by the researchers and related to the clusters to see if there are any prevalent patterns in the clusters. The latter two are used to test if the clusters of artwork also differ on dimensions other than the emotions that were used to create them. We collected data on a wide range of different visual artworks (see the Method section), to identify differences in characteristics, which we assume triggers emotional and cognitive patterns within the spectators. Therefore the main research questions in this study are:

1. Do environmental artworks (as a case of activist art) trigger different profiles in emotional reactions by the audience, which can be grouped in homogeneous clusters?

2. Do these clusters also correspond to differences in climate change-related cognitions and artist perception?

3. To which emotional and cognitive patterns do different characteristics of activist artworks relate?

Method

Research Context

The context in which this study was conducted was the ArtCOP21 environmental arts festival, which took place in parallel to the UN climate change negotiations COP21 in November/December 2015. The festival hosted all kinds of arts from music and theater performances to readings and exhibi-

tions. Our focus was on visual arts. This category was chosen in order to narrow down the immensely diverse field of climate change arts. All forms of visual arts were included, such as installations, paintings, sculptures, photography, collages, videos, and so forth made from a diverse set of materials (wood, metal, canvas, plastic . . .). The venues ranged from big institutions in Paris with renowned artists, such as the Grand Palais and the Museum of Modern Art, to small galleries, science museums, public places, and parks. Some artworks were participatory, requiring visitors to paint, write, and create themselves. Since this study was exploratory, the intention was to keep the spectrum of environmental visual art as open as possible, also including participatory art. How this decision might have influenced the selection of artworks and thereby the clustering and the results is discussed in the Discussion section.

Research Design

In order to answer our research question, data was collected from 874 spectators of 37 different visual artworks exhibited at the ArtCOP21 via a paper-and-pencil questionnaire survey. Venues for the data collection were chosen from the festival website (http://www.artcop21.com/), selecting from all events that were to take place during COP21 (November 30–December 12, 2016) under the category "visual arts," and located in Paris. All events were scanned for relevance to the topics "climate change" and "environmental changes/problems associated with climate change." From these keywords/themes, a selection of relevant artworks emerged (Table 1).

The period of data collection was set between the 5th and 12th of December 2015. Since the intention was to collect data from as many events as possible but still collect enough questionnaires for

Table 1
Artworks, Artist's Name, Venues, and Number of Participants per Venue on Which Data was Collected in Paris

No.	Artwork	Artist	Venue	Number of participants
1	*Our vision of the future*	Participatory artwork, painted by spectators	Le Bourget[a]	30
2	*Oeuvre Ensemble*	Véronique Le Mouël		20
3	*Ribbon Tree*	Participatory work, contributed by spectators		15
4	*Climat, état urgence*	Yusuf Ahmed and 20 other photographers		21
5	*Act responsible*	WWF		21
6	*Bees of bees*	Matthew Brandt	Musee d'art Moderne de la Ville de Paris	22
7	*From the New World*	YangYongliang		26
8	*Stil life*	Valerie Belin		23
9	*Drowning world*	Gideon Mendel		20
10	*Fridge Cube*	Les Radiolaires	Cite des Sciences et de l'Industrie[a]	16
11	*Crystall Ball*	Les Radiolaires		22
12	*Mur Vegetal*	Cicia Hartmann	Grand Palais	20
13	*Kiss Kiss Game*	Pixel Carre		23
14	*Nouveau Monde*	Alexis Tricoire		31
15	*Veolia*	Veolia, business		30
16	*Antartica World Passport Delivery Bureau*	Lucy and Jorge Orta		33
17	*Sky over Coney Island*	Spencer Finch	L'Espace Fondation EDF	38
18	*Il etait une fois . . . demain*	Chris Morin-Eitner		20
19	*Cloudscapes*	Tetsuo Kondo		24
20	*Pacha Mama*	Mamoune The Artist	Galerie Amarrage	22
21	*Venus of the trash Isle*	Jave Yoshimoto		21
22	*Manthan*	Manjiri Kanvinde		21
23	*Gaia*	Participatory artwork, created by spectators		22
24	*Birdman/Dreams/Redemption*	Yelena Lezhen		23
25	*Sertella Septentrionalis*	Laura Sanchez Filomeno		19
26	*Arctic Ice*	Lisa Goren		25
27	*La Terre*	Jisook Min		21
28	*Ice Watch*	Olafur Eliasson	Place du Pantheon	33
29	*Stoves*	Sterling Ruby	Musee de la Chasse et de la Nature[a]	37
30	*Breaking the surface*	Michael Pinsky	La Villette—Canal de L'ourcq[b]	30
31	*Climate is on the wall*	Care France Organisation	area surrounding Metro Jaurès[b]	15
32	*Honey Roads*	Eric Tourneret	Luxembourg Garden[b]	20
33	*Le film noir de Lampedusa*	Clay Apenouvon	Eglise Saint Merry[b]	26
34	*Nervous Trees*	Arcangelo Sassolino	Salle Olympe de Gouges[b]	19
35	*Blue Whale*	Un Cadeau pour la Terre, Biome	Port du Gros Caillou[b]	22
36	*Exit*	Paul Virilio	Palais de Tokyo	20
37	*Unbearable*	Jens Galschiot	Cite Universitaire[b]	32

Note. WWF = World Wildlife Fund.
[a] Locations are those inside, that are not specifically dedicated to the exhibition of art. [b] Locations are outside locations; participants could experience the artwork by chance.

a meaningful statistical analysis, the researchers aimed at collecting 30 questionnaires per event. Depending on the popularity and accessibility of the event, they were able to collect 15 to 38 questionnaires per artwork, with a mean of 23.9 questionnaires per artwork (also see Table 1). Each event was visited once; spectators present at that point in time were approached and asked for their participation.

Most of the events, even though they were registered on the festival website, were at a venue not recognizable as festival events. Quite a few of the artworks were exhibited in public spaces and people were merely passing by, seeing the artwork by chance, encountering it in the streets. Examples for such openly displayed artworks are artwork Nos. 28, 30–35, and 37 (denoted by the superscript "b" in Table 1). Other artworks exhibited at Le Bourget (No. 1–5) and at Cite des Sciences et de l'Industrie (Nos. 10 and 11) can be counted also as "encounter by chance," since people at those locations came for the exhibitions on science and industry, and not necessarily for art (denoted by the superscript "a" in Table 1). The other locations were mostly art museums or galleries, dedicated to the exhibition of art; however, none of them had a specific focus on environmental art. We would argue that the fact that the majority of participants did not know they were visiting an "environmental art festival" reduced the likelihood that people visited because they were particularly interested in environmental topics. This makes our findings relevant and generalizable beyond the sphere of the already convinced.

Procedure

At the venues, the researchers approached the visitors of the artwork and asked them in French or English whether they were willing to participate in the study. Participation was voluntary and questionnaires were handed out in French or English according to language preferences of the respondent. A reward for participation was offered in the form of a lottery between all participants (the value of the prize was 550€, which could also be donated to an environmental organization). Because many of the smaller venues were not frequented by many visitors, all spectators present at the time of visit were asked whether they wanted to participate in the study. No randomized procedure for selection of participants was applied.

Artwork Characteristics

Apart from recording the reactions of spectators of the artworks with questionnaires, we also noted the specific characteristics of each artwork. This was done in order to be able to define commonalities among the artworks themselves. The researchers completed a sheet on artwork characteristics for every artwork on which they collected data. The document contained check boxes on materials (canvas, metal, wood, etc.) and form of the artwork (painting, sculpture, video installation), among other characteristics (see the online supplemental materials).

Questionnaire

The questionnaire was kept short, since data was collected in the field and participants were not supposed to be distracted too much from the artwork. Answering the questionnaire took about 10 min. It first contained questions about the sociodemographics of the respondent and a question on experience with art in general and one on the perceived quality of the artwork which was measured on a 7-point Likert scale ("The artwork seems to be of considerable artistic quality") ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). After this, items on the emotional and cognitive variables, as well as questions on the perception of the artist, followed (Table 2). Those variables were also measured on 7-point Likert scales, which ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). An item was included measuring environmental attitude for which participants were asked to "compare yourself to others; how interested would you say that you are in environmental issues." These answers were also given on a 7-point Likert scale ranging from 1 (*far below average*) to 7 (*far above average*). The original questionnaire was in English, which was then translated to French by a professional translation office. To test the congruency of the French version of the questionnaire, a fluent speaker of both French and English compared the two versions and occurring issues were corrected.

Sample

The audience sample consisted of 490 women (56%) and 382 men (44%, missing = 0%), with a majority of French citizens (n = 621; 70%). The high number of French participants is to be seen as positive, since we wanted to reduce the risk to include tourists into the sample (although French participants could, of course, be tourists in Paris). Tourists during that time were—because of the climate summit—likely to be involved or interested in the climate change negotiations and the topic in general. The age distribution in the sample was heterogeneous, with a mean age of 36.62 years (SD = 16.43).

Participants were mostly highly educated, with 613 participants having a university degree (69%; college degree: 79, 9%; high school degree: 137, 15%, primary school degree: 34, 4%, and missing: 20, 2%). Asked about their experience with art, 290 (33%) participants indicated that they considered themselves to be an art lover and that they go to exhibitions regularly; 445 (50%) participants stated that they like art but do not consider themselves to be connoisseurs; 124 (14%) said that they sometimes like art and sometimes do not; 16 participants (2%) indicated that, with some exceptions, they do not really like art; and eight participants (1%) stated that they really dislike art and anything related to it. With a mean of 5.28 (SD = 1.21), the environmental attitudes of participants are within the range of other representative European studies (Special Eurobarometer, 2017; Steentjes et al., 2017), indicating that our sample was not above-average interested in environmental topics. We consider this positive for the generalizability of our results. A mean value above the midpoint of the environmental attitude scale (which would correspond to an "average level of environmental concern") is typical for this scale: people generally consider themselves better than average.

Results

Cluster Analysis

Cluster analysis is a large family of different data analysis techniques, which groups cases based on their similarity. The

Table 2
Items Measuring Variables From Environmental Psychological Theories Included in the Questionnaire

Item	Construct
To what extend does the artwork bring up each of these feelings within you?	
1. Happiness	Positive emotions
2. Hope	
3. A sense of awe	
4. Surprise	
5. Inspiration, enthusiasm	
6. Guilt	Negative emotions
7. Sadness/disappointment that nothing is happening to prevent climate change	
8. Apathy, or a sense of helplessness	
9. Anger	
10. Anxiety	
What are your opinions about the artwork?	Cognitions
1. The artwork has something unusual, which made me stop and look at it in more detail.	Potential to make people stop/step out of daily routine
2. The artwork makes me think and reflect on its meaning.	Contemplation
3. The artwork seems relevant to my daily life.	Relevance for daily life
4. The artwork highlights consequences of climate change that would affect me personally.	Personal consequences of climate change
5. The artwork gives me a sense of belonging to a group of likeminded people for whom the artwork speaks.	Sense of belonging to a group
6. The artwork is confrontational, i.e. has a shocking or aggressive undertone.	Confrontational and challenging social norms
7. The artwork makes me think about the problem of climate change.	Reflections on climate change
8. The artwork makes me think about my own role within the current climate situation.	Personal role within climate change
9. The artwork makes me more aware of my behavior's impact on the environment.	Awareness of personal impact
10. The artwork challenges rules and social norms in our society.	Challenging social norms
On a scale from 1 to 7, what kind of person do you imagine the artist to be?	
1. Someone like yourself	Perception of the artist
2. Someone thinking and living differently than most people.	
3. Someone with values similar to yours.	
4. Someone expressing the view of the public.	
5. Someone expressing the views of a minority.	

similarity between cases can be described by their distance on certain variables and results in a number of clusters that are as homogeneous as possible within the cluster and as heterogeneous as possible between the clusters. In simple words, with the cluster analysis on our material we aimed to find out if there are groups of artworks inducing similar emotional reaction patterns in the audience, which are, at the same time, different from emotional reaction patterns caused by other groups of artworks. Different cluster analyses types are hierarchical versus nonhierarchical cluster analyses, and agglomerative versus divisive approaches (Schmidt & Hollensen, 2006). Since with this method there is no right or wrong, we ran several kinds of hierarchical, agglomerative cluster analyses provided by SPSS[1] on the variables.

To be able to conduct the analysis, the audience responses were aggregated to the artwork level for use in the cluster analysis. This means that the mean value of every variable across all respondents was calculated for each artwork and then used as an input to the cluster analysis. According to a recent model of art perception, the Vienna integrated model of art perception, the initial visual art perception consists of an affective state, apart from some very basic bottom-up processing of art aspects (Pelowski, Markey, Forster, Gerger, & Leder, 2017). Afterward, in the top-down cognitive processing stage, the affective information is combined with the cognitive information, where we would categorize the environmental psychological variables we measured. Hence, we assume that the activist artworks would first lead to an emotional reaction, which then leads to higher cognitive reactions. Consequently, the clustering of artworks was based on the profiles on the emotional response patterns that they trigger. SPSS produces dendrograms of different clustering solutions, based on the clustering technique, which indicate at which step the algorithm assigns individual artworks to a specific cluster. The order of merging and the resulting cluster solutions might differ depending on the clustering technique and the dendrograms illustrate these differences. The different dendrograms were compared with each other and the researchers decided that Ward's method produced the most logical and interpretable cluster structure using the emotional variables. Exemplary pictures of the artworks for each cluster can be seen in Figures 1–4.

In the next step, the cluster membership of each artwork was used to study the profiles in the cognitive variables and perceptions of the artists, in order to discover if different emotional profiles also triggered differences in cognitions. Lastly, an analysis of variances was calculated to test if the differences between the psychological reactions were statistically significant (Table 3).

Independent of the clustering method used, artwork No. 25 (*Sertella Septentrionalis*) was always the last artwork added to a cluster, hence treated as an outlier and excluded from the analysis. In the following section, the resulting clusters are presented ac-

[1] Clustering methods provided by SPSS Statistics 23: between-groups linkage, within-groups linkage, nearest neighbor, furthest neighbor, centroid clustering, median clustering, and Ward's method.

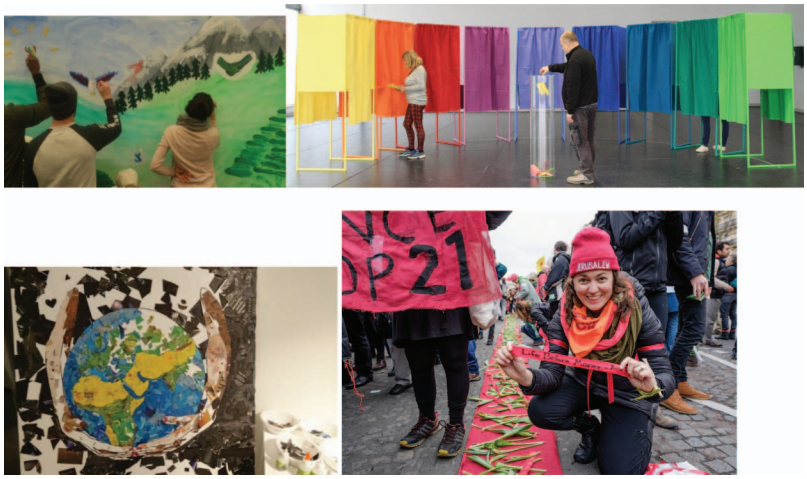

Figure 1. Exemplary pictures of participatory artworks with theme "dreams/utopia" setting up Cluster 1: (upper row, left to right) *Our vision of the Future*, artist credit: lay painters at Le Bourget. Photo credit: Lisa Pahlke; *Oeuvre Ensemble*, Copyright: Veronique Le Mouël: Oeuvre Ensemble, Veronique Le Mouël/BONO, Oslo, 2018. (lower row, left to right) *Gaia*, artist credit: visitors of Galerie Amarrage; photo credit: Laura Sommer; *Ribbon Tree*, artist credit: Ribbon Tree, photo credit: Walter Hergt. See the online article for the color version of this figure.

cording to the emotional and cognitive patterns they provoked, and examples of the artworks they consisted of.

Clusters of Artworks and the Resulting Emotional and Cognitive Patterns

The aggregated mean scores of the four clusters on emotional and cognitive variables can be seen in Figures 5 and 6. Results of the analysis of variance (ANOVA) testing for differences between the clusters are shown in Table 3 and according post hoc tests in Table 4. It is important to keep in mind that the emotional profile was used in the clustering algorithm to create the clusters, whereas the cognitive variables were not used in the clustering, but differences in these variables between the clusters were studied. The following sections describe the main characteristics of the clusters based on their profiles.

Emotional and Cognitive Reaction Patterns to Artworks in Cluster 1—"The Comforting Utopia"

In order to name the clusters, we combined the emotional and cognitive reactions the participants showed, together with the common characteristics we could identify in the clusters. We added the names already in the Results section here, to make it easier to follow the clusters and to be less abstract, even though the characteristics of the artworks are only introduced in the discussion.

Regarding the emotional variables, the "comforting utopia" shows, in comparison to the other clusters, positive emotions values ranging between the highest and lowest cluster, which means the artworks make people relatively "happy," "hopeful," and "inspired." For the negative emotions, the comforting utopia displays the lowest scores, which means the artworks make people feel only a little "guilty," "sad" and even less "angry" and "anxious."

For the cognitive variables, the comforting utopia was rated lowest on the perceived quality of the artwork. Participants reported a low level of activation in nearly all cognitive variables, with lowest mean scores for the variables "confrontational," "reflect," and "awareness of impacts." Furthermore, they think of the artists represented in this cluster as "expressing the view of the public," more than in the other clusters.

Emotional and Cognitive Reaction Patterns to Artworks in Cluster 2—"The Challenging Dystopia"

The "challenging dystopia" is the cluster with the weakest positive and the strongest negative emotional reactions reported on average by the participants. Artworks in this cluster make participants the least happy and hopeful, but manage still to "surprise" them. They make the participants feel most guilty, "apathetic," "sad and disappointed," "angry," and "anxious".

Regarding the cognitive variables, the challenging dystopia was rated third on the perceived quality of the artwork. It stands out by reaching the highest value on the variable "confrontational and shocking," which is in alignment with the negative emotions the artworks in this cluster are causing. It also reaches high mean values for "challenging social norms," "art has something unusual and made me stop," "relevance for daily life," and "awareness of impact." Regarding the perception of the artist, the challenging dystopia rated lowest or among the lowest for all the perception of the artist items, indicating that the participants did not identify with the values or intentions of the artists.

Emotional and Cognitive Reaction Patterns to Artworks in Cluster—"The Mediocre Mythology"

The artwork in the "mediocre mythology" show a relatively "flat" emotional pattern, causing neither strong positive nor neg-

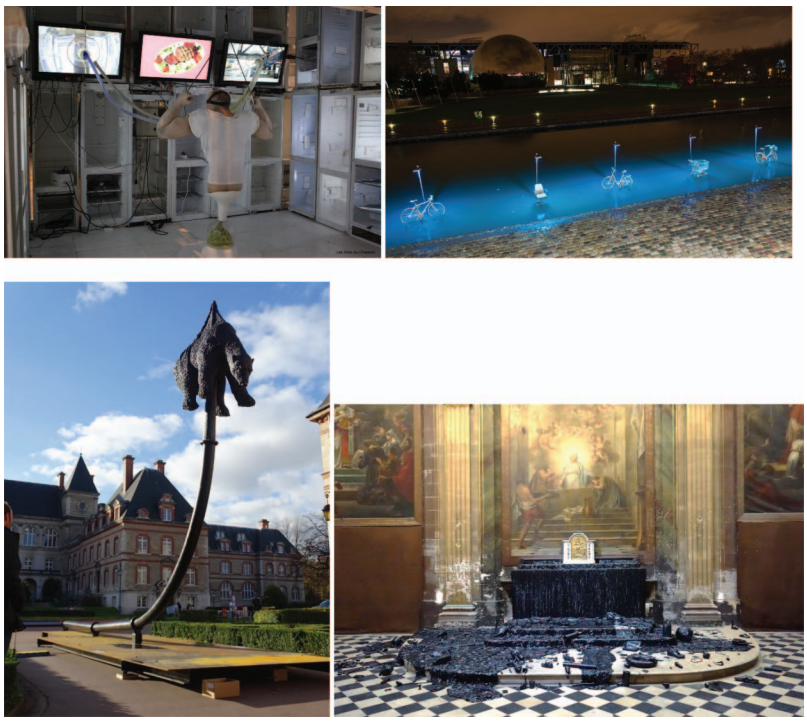

Figure 2. Exemplary pictures of artworks showing technical, metal or artificial devices, death and destruction setting up Cluster 2: (upper row, left to right) *Fridge Cube*, artist credit: Les Radiolaires, photo credit: Xavier Tiret, les Ailes du Chapeau; *Breaking the surface*, artist credit: Michael Pinsky, photo credit: Michael Pinsky. (lower row, left to right) *Unbearable*, artist credit: Jens Galschiot, photo credit: Art in Defense of Humanism; *Le film noir de Lampedusa*; artist credit: Clay Apenouvon, photo credit: Christophe Grelié, 2015. See the online article for the color version of this figure.

ative emotions. The highest mean values for emotional responses in the mediocre mythology are reached for the emotions "sense of awe" and "sadness and disappointment," but even these emotions remain second lowest among all clusters.

For the cognitive responses, the pattern is similar, meaning that artworks in the mediocre mythology do not seem to reach explicitly high or low values on any of the cognitive variables, even though the cluster was rated second on perceived quality of the artwork. The highest value was found for the variable "the art has something unusual and made me stop", which is in alignment with the emotion "sense of awe". In addition, "showing personal consequences of climate change" scored second highest among clusters, which could be connected to the emotion sadness and disappointment. Concerning the perception of the artist, "the artist has values similar to me" scored second highest among the clusters.

Emotional and Cognitive Reaction Patterns to Artworks in Cluster 4—"The Awesome Solution"

The emotional response pattern to the artworks in the "awesome solution" presents the highest values for all positive emotions, while at the same time showing negative emotions ranging between "the dystopian future" and the comforting utopia. The only exception is a peak in "sadness and disappointment".

Regarding the cognitive variables, the artworks in the awesome solution have the highest values for the variables "perceived quality of the artwork," "the artwork has something unusual and made me stop," "the artwork highlights personal consequences," and "highlighting one's own role within the climate situation." For the variables describing the perception of the artist, artists behind the works in the awesome solution reach the highest values for "the artist is like me," "the artist is thinking and living differently than most people," and "the artist has similar values as me." This indicates that participants in this cluster perceived themselves to be different from the general population, and similar to the artist.

Differences in the Profile Variables Between Clusters

In the next step, a series of ANOVAs were conducted in order to test whether the visual differences in the graphs between clusters were significant and meaningful. In the case that Levene's test indicated a violation of the assumption of homogeneity of variances, a robust test (Welch's test) was calculated in addition and reported together with the other results in Table 3. Results show for all the emotional variables significant differences between the mean scores in the clusters (which is to be expected since these variables were used for the clustering), while only some of the cognitive variables were significantly different. In the case of significant differences, post hoc tests were calculated to determine which clusters were significantly different. Table 4 displays the results of these tests in a condensed form. The full results table of

Figure 3. Exemplary pictures of colorful artworks showing geographical, systemic interconnectness as well as drawing on mythology setting up Cluster 3: (upper row, left to right) *Crystall Ball*, artist credit: Les Radiolaires for Universcience, photo credit: Xavier Tiret, les Ailes du Chapeau; *Climate is on the Wall*, artist credit: Doudou Style, photo credit: Lisa Pahlke. (lower row, left to right) *La Terre*, artist credit: Jisook Min, photo credit: Jisook Min; *Venus of the Trash Isle*, artist credit: Jave Yoshimoto, photo credit: Jave Yoshimoto. See the online article for the color version of this figure.

the post hoc tests can be obtained from Laura Kim Sommer on request.

Characteristics of Artworks

In order to answer Research Question 3 (To which emotional and cognitive patterns do different characteristics of activist artworks relate?), we looked for similarities among the artworks that constitute the clusters in the final step of the analysis. In order to identify similarities, we used the artwork characteristics rated by the researchers when the survey was conducted. As a method to avoid identifying random characteristics that only one or two artworks in a cluster have, we decided that at least three artworks per cluster (2 in the case of Cluster 4, consisting of only 3 artworks) needed to exhibit a commonality in order to assign it to the cluster. Table 5 gives an overview of the artworks in the clusters and their commonalities.

Discussion

With this study, we aimed at identifying emotional reaction profiles triggered by activist environmental art and related cognitive responses. We grouped the artworks based on these profiles and studied the common characteristics within each cluster, which might have led to the psychological effects on its audience. We hope to uncover which aspects of activist artworks have the potential to motivate people (to act in a more climate friendly manner). The analysis of 36 (37 − 1 outlier) different artworks exhibited in Paris during the 2015 UN climate change negotiations showed that some artworks lead to a higher psychological activation than others. The artworks could be

Figure 4. Exemplary pictures of artworks offering solutions and depicting sublime nature setting up Cluster 4: (left) *Mur Vegetal*, artist credit: Cicia Hartmann, photo credit: Cicia Hartmann (faitparcicia.com); (right) *Honey Roads*, artist credit: Eric Tourneret, photo credit: Eric Tourneret. See the online article for the color version of this figure.

Table 3
Results of Analysis of Variance, Levene's Test for Homogeneity of Variances, and in Case These Assumptions Were Not Met, of a Welch Test (Robust Method)

Variables and concepts	*F*	Levene's test	*df*1	*df*2	Welch test	*df*1	*df*2
Emotions							
Happy	8.59**	.00	3	32	.00	3	8.44
Hope	5.69**	.00	3	32	.00	3	15.32
A sense of awe	5.21**	.96	3	32			
Inspiration and enthusiasm	7.56**	.32	3	32			
Surprise	8.81**	.87	3	32			
Guilt	8.31**	.55	3	32			
Sadness and disappointment	6.73**	.34	3	32			
Apathy	4.88**	.16	3	32			
Anger	11.60**	.09	3	32			
Anxiety	9.76**	.96	3	32			
Cognitions							
Quality of the artwork	3.05*	.55	3	32			
Confrontational	8.90**	.26	3	32			
Challenging social norm	22.86**	.37	3	32			
Unusual/made people stop	27.37	.55	3	32			
Contemplate	15.07	.87	3	32			
Reflect	20.58**	.59	3	32			
Personal consequences	11.79**	.40	3	32			
Sense of belonging	12.52	.14	3	32			
Relevance for daily life	25.52	.95	3	32			
Own role	29.43*	.01	3	32	.00	3	12.11
Aware impact	19.68	.20	3	32			
Perception of the artist							
The artist is someone like myself.	1.90	.74	3	32			
The artist is thinking and living differently from most people.	1.65	.74	3	32			
The artist is someone with values similar to me.	4.46**	.81	3	32			
The artist is expressing the views of the public.	1.25	1.0	3	32			
The artist is expressing the views of a minority.	.80	.68	3	32			

* $p < .05$. ** $p < .01$.

categorized into four distinct clusters. The commonalities of the artworks and the psychological response profiles they elicit shall be discussed in the following sections.

Characterization of Cluster 1—The Comforting Utopia

As introduced in the Results section, Cluster 1 is named the comforting utopia, given the characteristics introduced here and the emotional and cognitive reactions it triggered. The comforting utopia consists of artworks that are playful, participatory, colorful, and visualize a "utopia"—a better future. However, they are perceived to have rather low artistic quality which, in the case of participatory artworks, can be interpreted as the spectators turning themselves into artists and not finding their work to be of high quality. On the one hand, the chance to participate (all participatory artworks ended up in the comforting utopia), the colors and the idea of a brighter future elicits happiness, hope, and very little guilt and sadness in the participants. On the other hand, this was combined with a low level of activation on the cognitive variables, no confrontation, and little reflection and awareness of impacts of the respondents' behavior. Even though Curtis et al. (2014) and Chandler, Baldwin, and Marks (2014) found that participatory artworks facilitate environmental engagement and help participants build a community, we could not find a higher sense of belonging to a group of likeminded people in the responses to artworks in this cluster.

Furthermore, it is interesting to see that artworks in the comforting utopia have the highest average level on "artist is expressing the view of the public" since all participatory artworks were grouped empirically in this cluster. It has to be kept in mind though, that this difference between clusters did not reach significance. It could indicate that when people create their own environmental artwork, they perceive themselves together with others shaping the artwork and thereby perceiving themselves as the public.

Characterization of Cluster 2—The Challenging Dystopia

The challenging dystopia consists of artworks that are dark in colors, contain metal or artificial material, and represent dystopian scenarios. Together with topics of death and destruction, the materials cause mostly negative emotions, such as "anxiety" and "apathy," which are already provoked by information on climate change not transported through art (Boulton, 2016). Based on the characteristics and emotional reactions, it is not surprising that the artworks in this cluster are perceived to be the most confrontational and shocking of all clusters. However, artworks in the challenging dystopia also made participants significantly more aware of personal consequences; they challenged their social norms, while at the same time giving them a reduced sense of belonging to a group. The characterization of this cluster fits with Nurmis' (2016) portrayal of environmental art in the last century. She describes the use of shocking messages, threat, and apocalyptic scenarios in climate change art and argues that the dark sublime

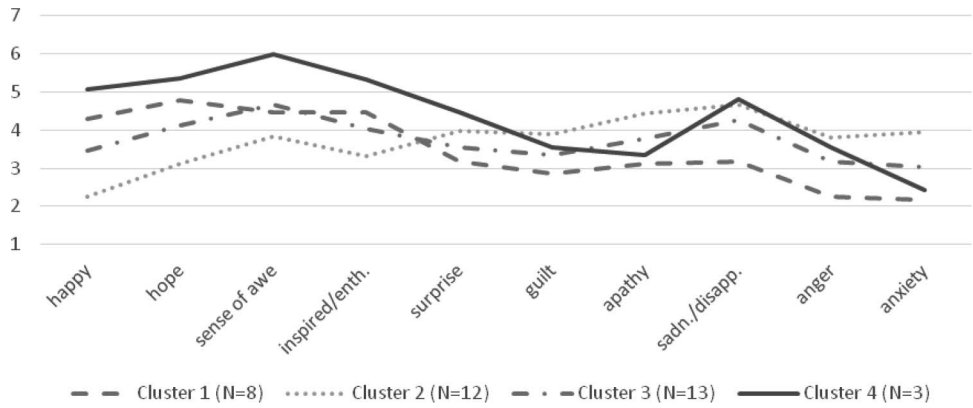

Figure 5. Pattern of the four resulting clusters on emotional variables.

of these pieces reinforces the spatial and time distance many people feel toward climate change, thereby questioning their effectiveness to inspire people to act. This is echoed in that artworks in the challenging dystopia did not trigger participants to reflect more, or clarify their own role within the climate crisis.

Given the cognitive and emotional pattern caused by artworks in the challenging dystopia, it can be assumed that dystopian art does not give a new perspective or build a different emotional connection to the topic of climate change than climate change campaigns do. Even though artworks in this cluster provoke significantly more "guilt" than artworks in the comforting utopia and the mediocre mythology and guilt has been shown to motivate behavior change (Rees, Klug, & Bamberg, 2015), it remains unclear whether guilt weighs more than other more inhibiting emotions, such as apathy and anxiety. Powell, Boomgaarden, De Swert, and de Vreese (2015) point out that research on moral emotions and climate change has been scarce so far, and research should be extended beyond the emotion guilt.

In addition, people who saw the artworks of the challenging dystopia did not feel that the artist has similar values to theirs, or that the artist was an outstanding personality in any other way. This is curious, since the artworks of several internationally renowned artists and big art venues in Paris are grouped into Cluster 2. The fact that spectators did not perceive these artists as representing values similar to their own might mean that the artists' intentions did not come through, or that the spectators did not perceive themselves as engaged with climate change. It might also be that the disturbing works in this cluster lead people to distance themselves from the artwork and, consequently, also the artists.

For the challenging dystopia, we summarize and conclude that the negative emotional activation, plus a low cognitive reaction and little identification with the artist, most likely does not lead to a very different reaction than information and education on climate change. Trying to scare people into change through dystopian art and news seems to be an easy fix, but does apparently not lead out of the deadlock of climate change fatigue.

Characterization of Cluster 3—The Mediocre Mythology

A colorful mix of materials, with themes of mythology and depictions of the Earth characterizes artworks in the mediocre mythology. The theme of the artworks is not as negative as of artworks in the challenging dystopia, showing interconnectedness

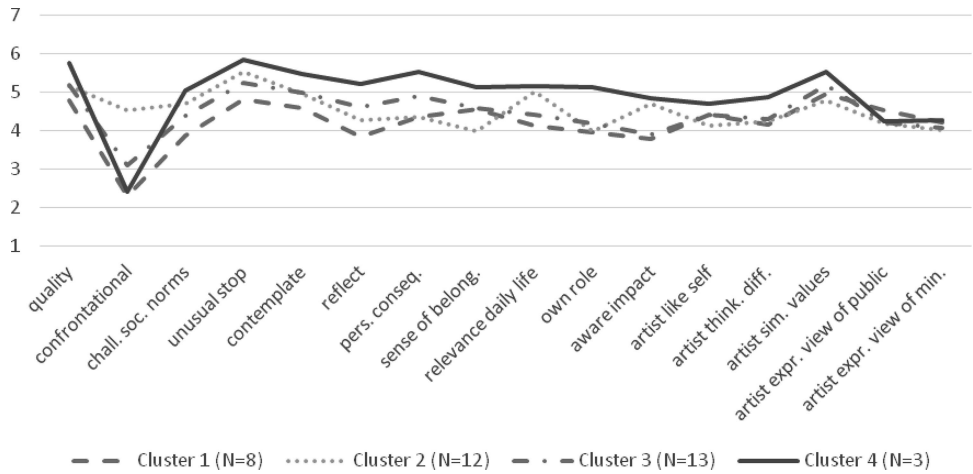

Figure 6. Pattern of emotional clusters over cognitive variables.

Table 4
Results of Post Hoc Tests of Cluster Differences for Cases Where the Overall Analysis of Variance Indicated a Significant Difference Between at Least Two Clusters

Variable	The comforting utopia	The challenging dystopia	The mediocre mythology	The awesome solution
Happy	a	b	a	a
Hope	a	b	a	a
A sense of awe	a,b	a	b	a,b
Inspiration and enthusiasm	a	b	a	a
Surprise	a	a	a	b
Guilt	a	b	b	a
Sadness and disappointment	a	b	b	a
Apathy	a	b	a,b	a
Anger	a	b	b	a
Anxiety	a	b	a	a
Quality of the artwork	a	a,b	a,b	b
Confrontational	a,c	b	a,b,c	c
Challenging social norm	a	a,b	b	c
Reflect	a	a	b	c
Personal consequences	a	a	b	a
Own role	a	a	b	c
The artist is someone with values similar to me.	a,b	a	a,b	b

Note. Same characters in two clusters indicate that they are not significantly different.

of the climate system, economic system, and other systems. The emotional and cognitive profiles triggered by the works grouped in the mediocre mythology are flatter than for other clusters and stay within the neutral range of the scale. With highest values for "the variables the artwork has something unusual and made me stop," "a sense of awe," and sadness and disappointment, the artworks seem effective to some degree. Concerning the perception of the artist, "the artist has similar values to me" shows higher values for works in this than in other clusters. The reactions indicate that the artworks are neither very shocking, nor very exciting. Therefore, we conclude that the artworks in the mediocre mythology do not reach a level of activation in their spectators that would culturally engage and awake the creative potential of societies as wished for by Curtis et al. (2014); Marks et al. (2017) and Hulme (2015).

Characterization of Cluster 4—The Awesome Solution

The common features of artworks in the awesome solution are beautiful and colorful depictions of sublime nature that are showing solutions to environmental problems. Exhibited outside in the public space, they are not openly labeled as "art." Those characteristics seem to have prompted mostly positive emotional reactions. The artworks were making their spectators "happy," "hopeful," "gave them" a sense of awe and left them feeling significantly more "inspired and enthusiastic" than artworks in the other clusters.

The positive emotions lead to a high cognitive activation, by making participants reflect significantly more, be more aware of personal consequences, and of their own role in climate change. The high activation might be connected to the perceived quality of the artworks, which was highest among all clusters. This was achieved by not just depicting the problem, but by offering solutions to the participants as part of the artwork, which was done only by artworks in the awesome solution. *Mur Vegetal* (Cicia Hartmann, 2015), for example, was a beautiful carpet of flowers made from upcycled material. The *Blue Whale* (Un Cadeau pour la Terre, 2015) and *Honey Roads* (Eric Tourneret, 2015) were both addressing the issue of biodiversity loss, while at the same time showing the sublime beauty of certain animals, making cause and effect of human behavior visible. In the *Blue Whale* and through the upcycling aspect of *Mur Vegetal*, solutions were offered and participants learned what they could do. In addition, all three artworks were making use of iconic animals, a topic that is discussed a lot in the media (Kontrick, 2018). This implies that the topics were easily accessible in the memory of the spectators and that they might have felt connected already. Another positive aspect was that the artworks were exhibited in the streets of Paris and not in an art institution, which makes them more accessible and confronts people who are not that used to reading artworks.

In the artworks forming the comforting utopia, participants had the chance to come up with solutions for climate change themselves, since they were the artists. In this cluster, the participants rated the artist to be someone expressing the view of the public, while in the awesome solution they did not. In the latter, participants rated the artist to be someone who thinks differently from themselves, while at the same time expresses their values, and not the view of the public. These findings seem to indicate that participants want the artist to be someone who stands out from the crowd, sees things differently, and makes it apparent to everybody else. At the same time, they want the artist to represent their values. Of course, this is very difficult to achieve and might explain why there were only three artworks clustered in the awesome solution. Not many artists, politicians, or communicators, for that matter, manage to bring up a relevant topic that is in the back of people's mind and depict it in a way that is surprising and engaging, while simultaneously representing generally accepted values. These parameters seem to be essential in order to touch the audience, and we would recommend that every artist interested in

Table 5
Clusters and the Artworks They Consist of, as Well as Commonalities Among the Artworks for Each Cluster

Cluster 1 (N = 8)		Cluster 2 (N = 12)		Cluster 3 (N = 13)		Cluster 4 (N = 3)	
No.	Artwork	No.	Artwork	No.	Artwork	No.	Artwork
1	*Our Vision of the Future*	6	*Bees of bees*	4	*Climat l'etat d'urgence*	12	*Mur Vegetal*
2	*Oeuvre Ensemble*	7	*From the New World*	9	*Drowning World*	32	*Honey Roads*
3	*Ribbon Tree*	8	*Still Life*	11	*Crystall Ball*	35	*Blue Whale*
5	*Act Responsible*	10	*Fridge Cube*	14	*Nouveau Monde*		
13	*Kiss Kiss Game*	19	*Cloudscapes*	15	*Veolia*		
16	*Antarctica Passport Delivery Bureau*	20	*Pachamama*	17	*Sky over Coney Island*		
23	*Gaia*	22	*Manthan*	18	*Il etait une fois*		
24	*Birdman/ Dreams/ Redemption*	28	*Ice Watch*	21	*Venus of the trash Isle*		
		30	*Breaking the Surface*	26	*Arctic Ice*		
		33	*Le film Noir de Lampedusa*	27	*La Terre*		
		36	*Exit*	29	*Stoves*		
		37	*Unbearable*	31	*Climate is on the Wall*		
				34	*Nervous Trees*		
Commonalities of artworks within the clusters							
Participatory		Illustrating technical or artificial objects		Illustrating interconnectedness		Showing solutions	
Playful		Dystopian		Depicting the world as a whole		Making cause and effect of human behavior visible	
Topic: Dreams/visions/ utopia		Topic: Destruction and/or death or social oppression		Themes drawing on mythology		Depicting "sublime" nature	
Colorful		Dark colors and use of metal		Colorful, mixed materials		Colorful	
Nonart locations		Mostly exhibited in art museum/gallery settings		Mostly exhibited in museum/ gallery settings		Mostly exhibited outside	

making a difference and achieving a better outreach to their audience should keep them in mind.

Limitations of the Study and Further Research

It should be considered that data collections took place during COP21 and the French government clearly signaled that climate friendly behavior was an important issue in order to facilitate a binding and universal agreement that is supposed to "maintain global temperature under 2 °C [. . .]" (Arnold et al., 2016). This political situation could have increased public attention on climate change and thereby primed the participants. Environmental attitudes in our sample were, however, in line with values from other European studies that are representative for the European population (Special Eurobarometer, 2017; Steentjes et al., 2017).

To our knowledge, this is one of the first studies which tries to systematically investigate the impacts of activist environmental art on spectators across a relatively large selection of artworks. Although data was collected from 37 different pieces of visual art, a cluster analysis is a qualitative approach and should be understood as an exploratory method. A downside of the large number of artworks included is the relatively small number of participants per artwork which, however, is still acceptable for a cluster analysis (Rand, 1971). The number of participants per artwork was strongly dependent on the turnover of spectators per artwork, and the time and funding we could allocate to the data collection. For the same reasons no randomization in the selection of participants was possible. We would argue that our findings are interesting and applicable, especially since we examine a wide range of visual arts in a real life setting. However, we would like to emphasize the exploratory nature of our study.

The selection of the clustering method is based on the resulting dendrograms and theoretical assumptions, and it can be argued that a different clustering method would lead to slightly different clusters. However, the differences between cluster solutions were not substantially different as, for example, artwork No. 25 (*Sertella Septentrionalis*) was an outlier across all methods. The other possible cluster solutions have been added as online supplementary material to this study (available online). We chose the clustering method, which had the most interpretable cluster solution according to the emotional reactions the participants had to the artworks.

Moreover, the postclustering characterization of the artworks and the assignment of common attributes are also qualitative, even though we tried to reduce subjectivity through the standardized artwork characteristics sheet. In addition, the researchers and their assistants were more trained in psychology than in art or art history. Possibly, a description of the artworks by people from the art field could have led to a characterization based on art theory and history of the artworks and the clusters. Future research should prefer such expert classification.

Most research on the perception of art has been conducted focusing on one specific artwork, or the color or orientation of figures within the artwork (Di Dio, Canessa, Cappa, & Rizzolatti, 2011; Joshi et al., 2011; Vessel et al., 2014) and we are breaking

with this approach in our paper. However, we still put emotions in the focus of aesthetic perception and connect characteristics of the art with the emotional reactions caused. We think that our findings are promising, building a bridge between environmental societal challenges, art, and psychology and justify more research into this transdisciplinary field.

Conclusion

Based on the clusters of artworks and, accordingly, the reactions of the participants, we suggest that activist art including environmental art should move away from a dystopian way of depicting the problems of climate change, toward offering solutions, and emphasizing the beauty and interconnectedness of nature. The use of dystopian elements to initially catch attention, but with the remaining solution focused and hopeful, may be even more promising in encouraging action. Moreover, it is important to move out of the institutional space of museums into the public, in order to reach out to a bigger audience, and to avoid the connotation that art is something reserved for the educated part of the population.

The awesome solution (Cluster 4) is the cluster with artworks where the most variables reach high mean values in comparison to the other clusters, over positive and negative emotions as well as cognitive variables. Therefore, it can be assumed that the artworks in this cluster lead to the highest psychological activation and this cluster is most interesting for artists, activists, and psychologists. The common characteristics of the artworks in this cluster should be taken into consideration by artists and activists who want to make a difference with their creative practice.

On the contrary, the fact that only three out of 37 artworks were grouped into the awesome solution deserves some attention. It is not easy to reach an audience, even if the intention of the artist and activist is to do so. It is not enough to simply show the problem in an aesthetic way, but according to characteristics of the awesome solution, it is essential to create a personal connection to the causes and consequences and offer solutions. "Painting things black" and inducing fear is also not the best way to go, since it induces more fear, which reduces motivation (O'Neill, Hulme, Turnpenny, & Screen, 2010).

Artists can be positive and negative voices, which emphasize the creative or destructive potential of people and societies. We were able to identify similarities between artworks that can explain why an artwork engages its audience in a positive way. The commonalities of artworks, especially in the awesome solution, can be used by artists as guidelines for creating works, which have the potential to retell the stories of climate change in a way that activates the slumbering potential in our societies.

Environmental psychology contributes by revealing the underlying emotional and cognitive mechanisms and helps to address environmental challenges, among them climate change. In order to do that, it is essential to bring together natural, social sciences and humanities, since "we cannot detach the stories we tell about climate [change] from the stories we tell about societies" (Hulme, 2009, p. 33). Finally, we cannot change our cultural environment to be more sustainable, without being personally engaged.

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