

DOES THE FACT OF UNDERGOING NATURAL HAZARDS INFLUENCE PEOPLE'S ENVIRONMENTAL VALUES AND ECOLOGICAL COMMITMENT?

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ABSTRACT

We study urban dwellers' perceptions of climate change and of their propensity to act ecologically. A better understanding of people's moral and psychological functioning toward ecology could guide the creation of more suitable environmental management strategies. Semi-structured interviews were conducted among urban inhabitants about their environmental values. They took place in a coastal French area affected by recurring floods. The results showed no relationships between experiencing natural hazards, becoming aware of sustainable issues and the intentions of "acting green". It turns out that these two last aspects mainly depended on informal education and socio-economic conditions. As a consequence, an "heuristic of fear" for developing sustainability among people (Jonas, 1984) might be inefficient. Practical efforts should be made on upbringing, education, self-efficacy and the whole socio-economic and politic regulations, especially in a country like France where people are historically used to welcome collective regulations by the welfare state.

KEYWORDS

Ecopsychology; Climate Change; Natural Hazards; Qualitative Study; Lexical Analysis.

1. Introduction

The first well-documented consensus of the world's leading environmentalists about dangers of climate change was published in 1992 by the Intergovernmental Panel on Climate Change (IPCC), in agreement with the first largest UN Earth Summit in Rio. Twenty years later (in parallel to Rio+20 conference and new IPCC report), the scientific community also sounded a strong alarm in a special issue of the famous scientific review *Nature*, claiming that the human footprint on natural cycles was currently at 43% and if it reached 50% it would be impossible to ever mitigate the damage inflicted by humans on nature. These concerns are echoed by 15000 commentators and critics in a more recently issued World Scientists' Warning to Humanity: A Second Notice (Ripple et al., 2017).

Over past several decades, many green policies (e.g., urban greening, nature-based solutions) have been implemented throughout the world in order to mitigate the human impact on environment. In France, they are illustrated by different regulations that have been implemented over the last 50 years (Lacroix and Zaccai, 2010). Indeed, the first Ministry for the Protection of Nature and the Environment dates from 1971. Since then, environmental measures have been aiming for the use of renewable energy and energy saving (in buildings for example), the protection of biodiversity (national, regional and departmental protected parks and water) and electric transportation among others (Cassen and Hourcade, 2019). However, the impact of the collective human effort is commonly judged to be largely insufficient (Vandenbergh and Gilligan, 2017). It is argued that, for the efficient transition toward greener future, individual commitments could prove extremely valuable. For example, Dietz and his colleagues (2009) demonstrate on the example of the United States that the voluntary adoption of energy saving practices by individuals could cut the household energy consumption by 20%. Changing consumption habits and practices, and incorporating environmental variables in every individual decision could allow for an efficient management of the anthropogenic climate change and contribute to change environmental values and behaviors.

Changing individual behavioral habits are notoriously hard, regardless of the field, as personal experiences play an important role (for example in health, see Callahan, 2013). This is all the more true with regard to the mitigation of climate change. As Swim and colleagues state (2009, 124, in the Report by the American Psychological Association's Task Force on the Interface Between Psychology and Global Climate Change), "habit may be one of the most important obstacles to the mitigation of climate change impacts". Therefore, policies encouraging greening of consumer behavior have to be well thought out. In terms of the most

important target population of such policies, city residents are attractive for two reasons. Firstly, urban dwellers have less connection to nature; as a result, cities contain higher share of climate change deniers (Babutsidze et al., 2018). Secondly, compactness of the urban settlements allows for higher efficiency of certain types of policies such as informational campaigns of encouraging visible green behavior (Babutsidze and Chai, 2018).

This is why the current article will focus on urban dwellers' perceptions of climate change and their propensity to act "ecologically". We will rely on multiple semi-structured interviews to study a case of urban dwellers who have undergone recurrent floods in a same city, located in southern France, where climate change has been directly linked to recent flooding and is projected to increase the future frequency of storms and heatwaves (Beniston and al., 2007). This study will focus on the possible effects of the exposure to natural disasters (floods, more precisely) in urban settings on individual ecological mindset and engagement.

The present qualitative research complements the first nation-wide survey of national climate change attitudes in France (Babutsidze et al., 2018). This survey involved a representative geographically and demographically stratified national sample of 3480 respondents. The overarching purpose was to study the extent to which (if at all) the French people have psychologically adapted to climate change, which tools do they use to cope with ongoing changes in the environment. Findings of Babutsidze et al. (2018) point toward a moderate level of overall psychological adaptation in French population. A notable exception is the frequency of discussions around climate change issues with peers and social contacts, where psychological adaptation was found to be very high. Deeper understanding of how citizens perceive and psychologically adapt to climate change is of great importance for developing a coherent and informed strategy to reduce carbon emissions and develop greater climate resilience, in particular in cities.

2. Literature

The existing literature guiding the current study can be separated in three related domains. The first domain presents sustainability and its different representations in people's mind through western history. The second one collects the studies in ecopsychology that examines the link between human functioning (thoughts, emotions and behaviors) and ecology (Fisher, 2013). The third section deals with ecological values according to ideologies. We review each of these streams of literature in sequence.

2.1. Sustainability

In people's mind, human history has been a slow but sure separation of man and nature (Harari, 2014). From our settlement to religious and scientific views (stemmed from Descartes mechanical world view and possessive view of nature), our history has led us to progressively disconnect from natural cycles. Some of us are now completely merged into artificial environments through urban development and cities. As a consequence, even if scientists recently questioned the dichotomy between nature and culture (whether by highlighting brain plasticity, or by understanding the interactions between genetics and environments), human beings have still a dichotomist view of nature and culture. They are culture; nature is something else. In their minds, they conceive them as separate entities. Therefore, they ignore the natural parts that are inherent elements of their world (Long et al., 2018). They, thus, believe they can own nature, manage and exploit it. This fragmented vision is also reflected in the conceptualization of sustainable development. The most widely used definition of 'sustainable development' was given by the Brundtland report (UNWCED, 1987, p. 51): "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Sustainable development is now considered to be integral to the "environmental, social and economic" triptych. Sustainability, thus, conceives an independent entity that is the economy "without name, without face, without responsibility" (Sauvé, 2008). This is particularly problematic, as psychologically this is of prime importance for our cognition (Schultz, 2012). It makes us consider that we are not part of nature; we are not natural, which, in return, explains the very fact that we can use and manage nature as a resource, a separated non-living object, as we please. In this regard, the communication of the UN has changed since the beginning of the 21st century. The organization is no longer bringing up the terms of financial or human resources in reports on sustainable development. Overall, it has become clear that a qualified resource element loses its intrinsic values, to the "profit" of a less advantageous value: that of being used or even exploited (Sachs, 1996). However, the advisory body in charge of sustainable development at the UN, the Economic and Social Council, omits in its title one of the three fundamental spheres of sustainable development: the environment. Yet, we are part of nature; we are nature; we innately need nature (Wilson, 1984). As a consequence, our lack of contact with nature leads us to new health troubles, known as "Nature deficit disorders", especially among children (Engemann et al., 2019; Louv, 2009). From a larger health point of view, longevity and health are associated with natural and local lives, as highlighted by what are called the "blue zones" throughout the world: Sardinia, Okinawa and so on (Poulain et al., 2004).

Conditions for sustainable human lives seems to be similar to the conditions of sustainable earth (Benyus, 1997). This consequence questions urban development itself and the growing of cities and consumption.

In addition, sustainability has often been viewed, organized and thought in technological terms (Atteia, 2009). This appears at the same time through the important number of articles focusing on technic and biological/chemical management for sustainability and the status of people in charge of those aspects in the civil society: engineers, who mainly undergo technical training. On the Scimago website¹, when the word “sustainable” is searched, at least 291 out of 337 returned items concern “sustainable technical management” (engineering, energy management, computing, innovation, building, etc.). It seems as if technological progress will save us from environmental problems (e.g., Baudrillard, 1970; Jonas, 1984). It is mainly since the Meadows Report that the urgency of changing the overall economic and demographic model is accompanied by considerable account for environment, and that the notion of sustainable development is defined as a “state of global equilibrium” (Meadows et al., 1972). Indeed, sustainability is also a psychological, symbolic and ideological affair. As very well documented by Descola (2013), nature is indeed a western social construction based once again on the distinction between humans and the rest of the living reign. Conversely, among Amerindian people with whom Descola lived as an anthropologist, the distinction between humans and nature does not exist. Humans are nature and nature (what we western people call “nature”) is human and personified; everyone has got a spirit and is an entity in him or herself. This deeply echoes Abram’s works (1996, 2010) which refer to some cultures that display a holistic and entangled view of the outside and inner world(s).

2.2. Ecopsychology

Ecopsychology is a relatively new field in psychology which explicitly deals with addressing ecological challenges (Doherty, 2011). It is exclusively geared towards sustainable issues that-is-to-say towards human aspects in nature protection and harmonious living. It is consequently an applied field of environmental psychology which globally “examines the

¹ <https://www.scimagojr.com>; This is a project/website that reports on scientific journal and country specific indicators developed from the information contained in the Scopus Database.

interrelationship between [built and natural] environments and human affect, cognition and behavior” (De Young, 2013, 17).

In ecopsychology, the value-action gap is a key characteristic (Chai et al., 2015; Gifford, 2011). This is a ubiquitous phenomenon where people who express concern about the environment often display little commitment to adjusting their own behavior (Barr, 2006; Flynn et al., 2009). This gap is seen as an important behavioral barrier to climate change mitigation (Markowitz and Shariff, 2012). This lack of responsibility is also revealed in other contexts of life related to environment. For example, the discrepancy between the connection to nature that people display and their short-term professional and economic needs has been convincingly documented in a tourism context (Kornilaki and Font, 2019). In a similar setup of outdoor activities, studies have reported on Professional Mountain guides who felt caught between environmental responsibility and socio-economic trends (Long et al., 2012).

Furthermore, when people view climate change mitigation as the responsibility of the government or industries, or as “someone else’s problem”, there may be large observable differences between their levels of concern and tendency to act. This opinion is especially true for French residents as a current survey reported that an overwhelming majority of French population attributed the primary responsibility for taking climate change action to either private industries/companies, the international community, or national governments (Babutsidze et al., 2018). Only one in eight respondents (12.75%) attributed responsibility to individuals and their families (including themselves). As a consequence, the people’s belief in their own capacity to mitigate the impacts of climate change (their self-efficacy) was only moderate, and was arguably lower than previous studies carried out in the United States, Australia and Britain (Leiserowitz et al., 2013; Reser et al., 2012; Spence et al., 2010). Yet, Ockwell and colleagues (2009) found the same results as Babutsidze and colleagues (2018) in UK in terms of fatalism, helplessness, lack of political and economic actions and so on. From a determinist point of view (Bourdieu and Passeron, 2000; Durkheim, 2014 [1933]), feeling individually helpless is correct since we are mainly determined by our social, economic and political meta-structures. This can be simply explained by the fact that we, human beings, are a very adaptive species. Our primary socialization through family education impacts us a lot, in particular from an ecological point of view. Then, secondary socialization (through school, media, sport, art, etc.) completes our identity construction. Determinist mechanisms might even better apply to a particular case of French people’s attitudes, since Dutton (2002), among others, showed how this nation was used and attached to a Welfare State that decides for

them. Indeed, even if the French citizenship conceptions have recently evolved, individuals still expect a lot from the State (Bonny, 1995).

In social psychology, a large body of research (e.g., Bandura, 2001; Rudolph et al., 2000; Tannenbaum et al., 2015) demonstrates that perceiving an issue or problem to be a risk is insufficient to generate meaningful ameliorative action. What is needed is both the perception of threat and the perception that one has the ability to respond meaningfully to that threat.

Numerous information campaigns about environmental challenges have been held worldwide and regionally (among many others, we can refer for example to two massive events in south East France, “Les Assises de la Transition Ecologique et Citoyenne” [Congress of the Ecological and Citizen Transition] in 2018² and “Nice Cool & Verte” [Nice, Cool & Green] in 2019³). Yet, information campaigns rarely help to trigger a change in behavior and are difficult to assess (e.g., Coffman, 2002). The individual, whether informed or not, does not stop acting against the numerous opportunities of general interest, and even paradoxically against his/her personal interest. Conversely, social influences seem to be very effective in terms of green behavior and consumption (e.g., Nolan et al., 2008; Conniff, 2009; Goldsmith, 2015). For example, including a social comparison of a household's electricity consumption relative to that of their neighbor(s) can reduce energy use by up to 6.3% (Allcott, 2011). Another example demonstrates a social influence on the installation of solar panels (Bollinger and Gillingham, 2012). It has been documented that when a panel is installed on a publicly visible roof, it triggers the installation of additional panels at more or less distant neighboring roofs. Yet another example concerns a hotel whose goal is to save energy spent on washing bed linen (Goldstein et al., 2008). In these environments, the most effective messages are those highlighting the ecological behavior of the previous guests of the room (close social distance). The reuse of the linen in response to such messages increases by 35 to 75%.

In addition, Weber (2006) showed that immediate individual and instinctive reactions were very rare regarding the consequences of climate change and overexploitation. In other terms, environmental issues require moral characteristics that are not in our mindset (Gifford,

² <https://at06.eu/>

³ <https://www.nice.fr/fr/l-agenda/nice-cool-verte/decouvrir?type=events>

2011; Marshall, 2015). Indeed, in our culture, moral functioning is daily based: it works on reciprocity, perceptible evidences and short-term timing, as highlighted by previous research (e.g., Long et al., 2018; Marshall, 2015). That can explain the resistance to change in terms of sustainable behaviors and long-term thinking (Herrick, 2018). Howell and Allen's study (2017) even highlighted no impacts of general outdoor experiences on ecological engagement, which could be in opposition with common sense (and with the general hypothesis of this study).

2.3. Ideologies and ecological values

Ecological values are a matter of ideology. Whereas Samdahl and Robertson (1989) argued that liberal ideology was linked with supporting eco-friendly actions, most studies assume that collectivist attitudes are better predictor of pro-environmental behaviors. Indeed, based on Schwartz' norm-activation model, Stern and colleagues (1995) showed a relationship between biospheric value and pro-environmental behaviors. This biospheric value refers to the self-transcendence dimension toward nature and highlights the importance of having a collective ideology for addressing environmental issues. Other studies (e.g., Karp, 1996) added the importance of the openness to change dimension for adopting pro-environmental behaviors. A five-country survey, a cross-cultural survey conducted by Schultz and Lynnette (1998), also showed a positive relation between pro-environmental behaviors and what Stern et al. (1995) called biospheric value, and, in a lesser manner, self-transcendence value. It also highlighted the negative relations between self-enhancement (egocentric attitude) and pro-environmental behaviors (whatever the country was) which support the importance of collective values in comparison to individualistic values regarding sustainability. French people are considered to be individualistic according to Hofstede (1980). Having said so, Deng et al. (2006) found no differences between Chinese Canadians and Anglo-Canadians regarding biospheric values although the first ones were more supportive of social-altruistic values than the second ones. These empirical differences deserve more scientific attention since they are still controversial.

Heath and Gifford (2006) have shown that capitalism goals were not compatible with adopting sustainable conducts. They are in line with Dunlap and McCright's (2008). Many studies have shown the negative impacts of money (e.g., Gino & Pierce, 2009; Piff et al., 2012; Vohs et al., 2006) on psychological dimensions (like empathy, individualism, cheating...) which can explain our lack of links (social bond, natural connections, etc.). Long (2016) even suggested to build a new definition of sustainability by removing money from the

triptych: a sustainable world without money would then only articulate the welfare of people and the protection of nature (if ever different).

As a result, the present study aims to better understand people's mindset about nature, environmental issues (in particular climate change) and their propensity to act "ecologically". It will then question both the brakes and the triggers of "green" behaviors and values thanks to a qualitative and comprehensive approach of people's reasoning. Doing so, its objective is to enrich the quantitative and descriptive results of the first nation-wide survey of national climate change attitudes in France (Babutsidze et al., 2018). Current scholarship (e.g., Lorenzoni et al., 2007; Wolf & Moser, 2011) highlights the importance of qualitative approaches in order to better understand individuals' ecological moral reasoning. As Lorenzoni et al. (2007, p. 148) put it, "there is a need of in-depth research that examines inconsistencies and ambiguities in beliefs, values and actions" concerning ecological issues like climate change. This is what the present study aims to do in the current French context.

3. Material and methods

3.1. Subjects

The study subjects were ten urban dwellers who underwent at least one big flood in 2015 (seven of them also underwent floods in 2011 and earlier). They lived in a small town (around 10 000 inhabitants) in southern France, near the Mediterranean Sea. They have been categorized as "urban dwellers" as their city is located in the urbanized coastal strip of the "Alpes Maritimes" department, as described by the French National Institute of Statistics and Economic Studies (INSEE). In this coastal strip, the density of inhabitants is over 400 inhabitants per square kilometer⁴. From a geological point of view, the city in question is also surrounded by rivers flowing into the sea. In addition, it is characterized by an important urban and commercial development over last decades. Eight out of these ten participants lived in adjacent residential neighborhoods. Unsurprisingly, they had similar socio-economic and cultural characteristics. Three of the respondents were between 45 and 54 years old; three others between 55 and 64 years old and the remaining four were over 65. The small size of this sample does not detract from the validity of this research and the relevance of the results.

⁴ Since the urban/rural dichotomy has been scientifically questioned (Champion and Hugo, 2004), the United Nations Statistics Divisions recommends that "each country should decide which areas are to be classified as urban and which as rural, in accordance with their own circumstances". See <https://unstats.un.org/unsd/demographic/sconcerns/densurb/densurbmethods.htm#D>

Indeed, it turned out that the empirical saturation (Glaser and Strauss, 1967) was reached quite early in the interviews. As Morse (2015) highlighted, saturation is attained when no new categories (themes) appear during the interviews. While coding our 10 first interviews through a thematic analysis⁵, we noticed that no new themes volunteered by our subjects during interviews appeared after the 6th interview.

3.2. Interviewer and interview procedure

A semi-structured interview was conducted with each participant. The same interviewer conducted all the interviews in this study. He was a researcher in moral psychology and environmental ethics. He was familiar with qualitative methods (Patton, 1990). Two pilot interviews were also conducted prior to the main set of the interviews, and minor refinements were made as a result of the participants' feedback.

After personal consent was given, individual interviews were conducted, with each lasting approximately 45 minutes. The interviews began with a presentation of the study, introductory comments and scientific precautions. All participants were assured that their identities would remain anonymous and that their personal opinions were important. The researcher then asked permission to record the interview. After the participants agreed to the request, the interviews started. They ended by asking the participants to share their perceptions of the interview and inviting them to make any additional comments.

3.3. Interview guide

The interview guide was developed to help participants describe their memories of the flood, their perceptions of climate change and their representations of nature and green behaviors.⁶ As a consequence, the first section of the guide contained questions related to their memories of the flood (e.g., Could you tell what happened for you during the flood in 2015? What were the consequences for you?). The questions in section 2 about the perceptions of climate change concerned different points: their beliefs, their perceived causes and the perceived possible solutions (e.g., Why do you -or don't you- believe in climate change? Do you -or don't you- think there is a relation between climate change and natural hazards? Why or why not? etc.). Finally, section 3 was a more open section since the participants were told to talk about their relationships with nature, their representations of

⁵ The depiction and results of the thematic analysis are not presented in this article due to word limit, however they largely corroborate presented results.

⁶ The interview guide can be obtained from authors upon request.

ecological behaviors and the place of human beings within the natural environment (e.g., Why do you -don't you- feel yourself close to nature? Why do you -don't you- consider yourself to be environmentally friendly? What do you think is our place in the nature?). Throughout the interview, follow-up questions were used to help the participants to expand on and justify their responses.

3.4. Trustworthiness

Several steps were taken to enhance the trustworthiness of the collected data and subsequent analysis. Firstly, the pilot study helped to establish a conceptually aligned interview guide. Secondly, the interviews were audio-taped and transcribed verbatim. Thirdly, we have used automated lexical analysis methods which outsource association detection to a computer software that is free of context and potential bias that human analysts might suffer from.

3.5. Data analysis

After rendering the interview transcripts into a common textual corpus, we have conducted the lexical analysis of the data. The analysis was carried out in software A.L.C.E.S.T.E.⁷, which is specially developed for French-language applications (Reinert, 1990). In previous work, this software appeared to be a reliable, valid and critical tool to analyze interviews conducted in French language (e.g., Romand and Pantaléon 2007). The general aim is “to determine how the elements that constitute a text are organized” (Reinert, 1994, p. 153).

The lexical analysis (thanks to ALCESTE software) starts out by defining a limited number of variables, and proceeds in two steps. As the first step, the Hierarchical Descending Classification was carried out. This enabled us to distinguish lexical classes. This methodology identifies the vocabulary most frequently used, co-occurrences of terms, and the presence of repeated statements. It divides the corpus into Elementary Context Units (ECUs). This classification builds classes, each characterized by a specific vocabulary and associated with implemented variables of the study. Following the interview guide, four variables (themes) were pre-defined, implemented in the corpus and used in hierarchical descending classification: 1) description of the flood (*description*), 2) perceptions of climate change

⁷ “Analyse de Lexèmes Co-occurents dans les Enoncés Simples d’un TExte”. In English: “Analyzing the Co-occurrent Lexemes in Simple Statements of a Text”.

(*climateChange*), 3) perceptions of ecological behaviors (*ecoBehavior*), and 4) perceptions of nature (*nature*). This implementation facilitates the interpretation of the results, the characterization of the obtained classes and their associated vocabulary (Elementary Context Units, ECUs), as shown in Table 1. ALCESTE also provides Textual Units (TU), sentences, from the more representative Elementary Context Units (ECUs), words, of each lexical class (Bart, 2011). Relevant part of Textual Units appears in the results sections in the form of interview extracts. At the second step, ALCESTE performs a Factorial Correspondence Analysis to identify organizing principles of these classes for a better qualitative understanding of the “environmental reasoning” by the interviewees.

4. Results

Hierarchical Descending Classification. This step identified four lexical classes prevalent in our ten interviews. The profiles of the different classes were characterized by certain recurring words. The distribution of the vocabulary and variables associated to each class is presented in Table 1.

Insert Table 1

Class 1 contained 44% of the Elementary Context Units (ECUs) in the whole corpus. It revealed the specific vocabulary of the participants concerning their experience of flooding. From a quantitative point of view, the importance of this class highlights the stunning memory of the natural hazard. This one is still vivid in people’s mind as it is a key event in their lives. As a consequence, their description refers to the evolution of the flood (words like “water”, “rise”, “high”) and to the loss of material things which were completely moved away and brought by the water (words like “cars”, “houses”, “furniture”). Everything (and everyone) was submerged by the “waves” from a physical and psychological points of view. This repetition of this word “wave” showed the perceived violence of the flood. The physical force involved in this disaster also appeared through excerpts of interviews such as “the floating car smashed the wall”, “the whole bridge was washed away”, “There was a big noise and the electricity went out”, “It is even more impressive at night” or “We could hear the helicopter”. Even if it did not appear much throughout the words, the emotions were palpable. We don’t dwell on this class further, as the analysis of the experience itself is not the main objective of our study.

Class 2 contained 22% of the Elementary Context Units in the whole corpus. It referred to the climate change perceptions of the participants. Beyond the overall belief in such an ecological change, the participants' talk pertained to three main and related domains: a running urbanization (words like "zone", "works"), economic stakes ("euro", "price", "pay", "taxes") and politics ("State", "Regional Representative"). These ideas were mainly referred to evoke perceived reasons for climate change. The monetary toll of the flood was often evoked, and represented the most important aspect of the stressful event. In people's mind, money seems to run many things in society, as illustrated by these excerpts of interviews: "We're led by money", "We live in a society that deals too much with money. We don't think anymore of humans nor nature" or "It is the trap of the system. There are many things that parasitize you but you become dependent despite you." The participants also often referred to the irresponsibility of politicians who have let "it" happen. As one participant put it: "climate change does not appear like this, at once!" This irresponsibility was also viewed through the fact that the participants thought that, now, politicians hid behind climate change to disengage themselves from natural hazards. In addition, the repeated floods underlined the slowness of the political system to react, anticipate and modify the environment to avoid such future natural hazards. Some excerpts of interviews illustrate this idea: "They are building everywhere, without calculating: there was Sophia [a nearby technological park], now Polygone Riviera [a nearby mall] and Carrefour [another mall] is now growing to face the concurrence. It's completely mad!" or "We need to find a big solution, no small adjustments." The participants were clearly frustrated by not being heard and better helped by local representatives, as illustrated by this excerpt for example: "He went to the mayor to ask him to act ecologically. The mayor answered: if I do that, I won't be reelected."

Class 3 contained 23% of the Elementary Context Units in the whole corpus. This class was associated with three variables of the study: the perceptions of climate change, nature and ecological behaviors. The text belonging to this class calls for a global change driven by politicians (at all levels) – but not individuals. Sustainability appeared to be a "world" issue. Ecological problems came from people's way of living in the participants' mind: the "human hand", the human footprint on the planet. Here is an excerpt of interview that illustrates this idea: "Human beings invade everything. They want too much; they want to grab everything for money." According to our subjects, human beings have taken too much space on earth. In addition, the subjects believe that the will to "control" everything (in particular natural resources) has led us to climate change. This cold and devitalized relationships to nature was

also highlighted through a very illustrative excerpt of interview: “facing us, you have people [politicians] who has a stone instead of the heart.” This distance was also felt among participants towards ordinary people: democracy was at stake in their speeches. According to the respondents, people have lost their knowledge and connection to nature. The participants viewed natural hazards as warning events of the potential upcoming disaster, as expressed in the following excerpt: “It is a pity that human beings can’t learn from what nature tells us...” They “wondered whether it is too late or not to act”.

Finally, class 4 is close to class 3. It contained 11% of the Elementary Context Units in the whole corpus. It mainly referred to ecological behaviors. Within this domain, the participants referred to common and well-known green behaviors in terms of food and recycling, with words like “bio”, “organic”, “compost”, “selective sorting”. What is worth highlighting here was their emphasis on upbringing and transmission: “child”, “father”, “convinced” and so on. According to the sample, they didn’t change because of the different floods but because they were already convinced through their upbringing. Some of them had a very early “mark” of ecology and nature thanks to their parents or grandparents. They were already connected to nature before undergoing natural disaster, as illustrated by these excerpts of interviews: “I was about to say: nature is human”, “I think we must act in relation with nature” or “Personally, I communicate with trees!” The last selected word for this article in this class, “local”, seems to be a key word for the respondents. For example, one of them argued that “in his secondary house, in the countryside, there is no money, there are just exchanges: I can help them by fixing their house and they give me vegetables”.

The separation between what they lived during the floods, their perceptions of climate change and their talks about ecology and nature clearly appeared in the next stage of the analysis.

Factorial Correspondence Analysis. This method enables us to highlight the relationships (distance, proximity or opposition) between the four classes. This approach is similar to factor analysis. It breaks down the variance in the correspondence into a few orthogonal factors. Figure 1 shows the relationship between the four classes as derived from the two-factor correspondence analysis. The classes are presented in different colors and the distance between the different colored words corresponds to the lexical distance in the interview corpus. Notice that the only two main factors already account for 73% of the variance.

Insert Figure 1

Factor 1 is measured along the horizontal axis in the Figure 1. It accounts for 39% of the variance in the data. It contrasts the speech about the flooding experience (on the right hand side) to the three other classes about individual perceptions (on the left hand side). This gap along the horizontal dimension represents an important finding. It points to the fact that people do not tie their individual experiences to individual perceptions of climate change, nature and ecological behaviors, what also appeared through their speeches.

Factor 2 is measured long the vertical axis, and accounts for 34% of the variance. It demonstrates the contrast between the class 2 (*climateChange*) and, jointly, classes 3 and 4 (*ecoBehavior* and *nature*) in interviews. In other words, the spread along the vertical dimension shows the clash between subjects' perceptions of the climate change and ecological behaviors. This dichotomy summarizes the participants' environmental concerns and their individual (and collective) fatalism and helplessness. It seems that citizens do not take responsibility for their "brown" behaviors.

The two findings from the factorial correspondence analysis imply that, in their mental representations, people do not necessarily tie their individual behaviors to climate change. Moreover, individual experiences' memories (even as devastating and as strongly associated to climate change as the flood that our subjects suffered from) cannot be effectively used as the lever for changing these individual usual representations about promoting individual ecological commitment. For the participants in this study, a sustainable world globally seems to be opposite to our current world. It is mainly a matter of collective policies for them; not a matter of individual actions. This mindset might limit the individual environmental responsibility.

5. Discussion

This study aimed at scrutinizing people's perceptions of climate change and their propensity to act "ecologically". Among a group of urban inhabitants who have personally undergone one or several extreme weather events, the perceptions of climate change were very salient. Their explanations of such a problem revolved around the economic and political system. In contrast to findings from other countries (e.g. United States - Leiserowitz et al., 2013; Australia - Reser et al., 2012; Britain - Spence et al., 2010), our respondents *never*

attributed climate change to individual behaviors.⁸ This can be explained by French political history – the presence of a strong welfare state in which all collective responsibilities are insured by the state (Dutton, 2002). This is just a hypothetical explanation since no studies have been found about the comparison between welfare states and liberal states according to environmental management, as specified in the literature part.

In the present study, the participants also generally put the blame on the global economic system, which is supported by scientific claims (Dunlap and McCright, 2008; Heath and Gifford, 2006). The participants of the current study also expected the politicians to do something, but acknowledged being hopeless in terms of efficient solutions being actually found. This finding is in line with other previous findings about feeling of self-inefficacy regarding sustainability (e.g., Ockwell et al., 2009). It could be explained by their habits to refer to the State to solve collective problems (Dutton, 2002). Even if French people were considered as individualistic (Hofstede, 1980), this finding seems to be in line with collectivist societies, such as China (Ma et al., 2018) but also with the very spread distrust attitude of people toward governments (Lorenzoni et al., 2007). In that way, the sample of participants distinguish itself from the Anglo-Saxon nations whose people feel more efficient individually (Leiserowitz et al., 2013; Reser et al., 2012; Spence et al., 2010).

Interviewees acknowledged that experiencing floods has not made them act and think greener. This even under the condition that they all confirmed feeling the clear link between climate change and increased frequency of extreme weather events. They underlined that their behavior (including “ecological” behavior) and values are determined by their (informal) education and upbringing. This highlights the power of social influence for ecological behavior (Nolan et al., 2008; Goldsmith, 2015). This finding is a strong argument for developing greener, ecologically more responsible cities, as cultural spillovers through social learning could be used as levers to motivate individual ecological engagement (Babutsidze and Chai, 2018). Having said so, except upbringing, participants of this study didn’t refer to social influences a lot in their speeches. Two explanations could be put forward. One such explanation is that these influences act at an unconscious level. The other is that people do not generally accept, and therefore acknowledge, to be influenced: they culturally value their free will. That is why creating ideologically and physically sustainable environments is of first importance for influencing people’s individual mindset.

⁸ However, one has to acknowledge the small size of our sample. A broader study of French residents (Babutsidze et al. 2018) shows that there is some attribution of climate change to individual behavior among urban residents, but this is still low (less than 10%).

Our subjects also mentioned the importance of the connection to nature for them and their “green” self-identity, similar to the French population at large (Babutsidze et al., 2018). They stressed the need to de-urbanize cities and their surroundings. They saw it as a possibility of revitalizing nature and avoiding floods (by absorbing rainwater thanks to a natural and permeable soil). However, even here the attribution of the responsibility for action to somebody else (government) was clear.

Although we have started operating under the premise that strong individual experiences could be efficient levers to transform individual’s behavior and values, our research has shown that this is not so, at least when it comes to the experience of extreme weather events and individual “ecological” commitment. We have highlighted that people who have undergone recurrent floods have not altered their perceptions toward environment because of floods. This result might contradict the “heuristic of fear” developed by Jonas (1984) for entering a sustainable world.

Taken the qualitative findings of this study with the associated above-mentioned quantitative survey (Babutsidze et al., 2018), we would argue that the move toward individual ecological commitment is hard in today’s French society, despite substantial concern with climate change. This situation is quite common throughout the world (e.g., Ockwell et al., 2009, as far as UK is concerned). Yet, our participants felt climate change is a close threat causing the flooding: as a consequence, they feel and are affected by climate change. In addition, they are much more aware of the causes of climate change and global warming. For them, even if the three levels of engagement developed by Lorenzoni et al. (2007) are fulfilled (the cognitive, emotional and behavioral levels), they said they haven’t changed their behavior because of climate change.

As a consequence, moving forward to sustainability would require significant organized efforts toward reallocating human activities into greener domain. Indeed, some participants referred to the social and solidarity economy, which requests a relocation of our activities and exchanges. By doing so, they echoed scientific results about the dangers of money and the consumption society in terms of psychological benefits (e.g., Piff et al., 2012; Vohs et al., 2006) and sustainable ecological beliefs (Heath and Gifford, 2006).

6. Practical implications

From an applied point of view, this transition toward more sustainable practices can be fostered through three channels.

Firstly, the government can play a role through appropriate legislation which has individual ecological engagement and efficacy at heart. This approach could be an efficient way to bridge the ecological value-action gap identified by this and other studies. However, in the circumstance when citizens have lost trust in their representatives such a top-down effort might backfire. This is evidenced by long-lasting nation-wide “yellow vests” protests inception in December 2018 in response to French government’s new ecological tax. In this respect, the encouragement of the participative forms of environmental management might be more efficient for sustainability purposes (Rollason et al., 2018).

Secondly, we should harness the positive transformative potential of the green social influence. Making sure that environmental responsible behavior becomes a social norm seems to be of a paramount importance. In this respect, densely populated areas, cities, can play an important role, as they ensure visibility of green practices and values. The visibility of environmental behaviors has been identified as a prerequisite for maximizing the social impact of green behavior (Babutsidze and Chai, 2018).

Lastly, the society should work hard on psychological adaptation to climate change. This is the key result of this study. Indeed, mitigation climate actions deeply stem from psychological mechanisms that are increasingly resisting the accumulation of evidence of the dangers of climate change (Stoknes, 2015). These actions are all the less numerous as our (cognitive, emotional, symbolic...) outdoor experiences are less and less frequent (Fleury and Prévot, 2017). These barriers are so powerful that Gifford (2011) named them “the dragons of inactions”. In particular, changing behavior in this domain is viewed as stressful, demanding and insignificant. As a consequence, sustainable efforts should favor the work on the perception of self-efficacy over information campaigns. Psychological adaptation through the consciousness of the importance of acting individually could lower the barrier protecting individual brown actions. Informational campaigns under the conditions of high climate change concern and persistent value-action gap seem to be futile in this respect. However, this mostly concerns informational campaigns directed at increasing the environmental concern and values in general public. Campaigns directed on educating citizens about types of seamless green actions they can take in order to bridge their value-action gap should be maintained, as complementary research found low literacy in French public in terms of green actions available to them (Babutsidze et al., 2018).

7. *Conclusion*

The whole scientific literature seems to highlight the same thing for ecological campaigns: it doesn't seem worthy to insist on ecological issues and climate change to affect people's behavior. Our study can open a new way for addressing these issues: early education and the development of the perception of self-efficacy in addressing climate change and global ecological problems. In fact, behaving for ourselves could tackle many common psychological barriers (such as perceived self-inefficacy, perceived inequity or judgmental discounting, as named by Gifford 2011). This is also why Ockwell and colleagues (2009, p. 305) prefer participatory approaches to emissions mitigation compared to top-down actions. As a result, it looks like the society has largely chosen a wrong way to address environmental problems. In the near future, we would like to test the following proposition: it is more effective to address climate change through psychological and ideological development rather than focusing on the environment. Among other methods, this claim could be tested by qualitative research aimed at studying the life trajectories of individuals who have completely transformed their lives for sustainable ones.

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Table 1. The four classes of the lexical analysis.

Class	Class 1	Class 2	Class 3	Class 4
	412 ECUs 44%	205 ECUs 22%	217 ECUs 23%	88 ECUs 11%
Characterization of the class	Description of the flood	Perceived reasons for Climate Change	Sustainability, A matter of society	Ecological Behaviors and education
Associated vocabulary	Water Rise Wave Rain High Car House Floor Electricity Furniture	Zone Works Euro Price Pay Taxes State Regional representative Climate change	Nature Politics Question Society Human Hand Control President Townhall World Father	Bio Eat Organic Food Compost Vegetables Garbage Plastic Selective sorting Convinced Child Local
Associated variables (χ^2 , percentage of elementary context units of the class)	<i>description</i> (192, 74%)	<i>climateChange</i> (25, 34%)	<i>ecoBehavior</i> (46, 38%) <i>nature</i> (7, 39%) <i>climateChange</i> (4, 28%)	<i>ecoBehavior</i> (72, 22%) <i>nature</i> (3, 17%)

Notes: Only meaningful and most important Elementary Context Units (ECUs) of each class have been selected for this article. Following Reinert (1993), these ECUs are selected based on both Chi squared values and the researchers' interpretation of the nature of the problem. The ECUs are presented by decreasing order of Chi squared value within each class.

Figure 1. Factorial Correspondence Analysis Graph.

