Natural environment and its psychological effects: Exploring individuals' narratives

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Abstract

In recent years, several clinical syndromes have emerged, labeled as eco-psychopathologies, underlying the psychological relationship between individuals and natural environment. The aim of the present study was to analyze the nature of psychological distress related to this relationship administering to a sample of 20 participants: the Eco Psychopathologies Interview. The narratives elicited by this semi-structured interview were recorded and transcribed. The elementary context analysis, carried out with the T-Lab software, led to a two-factors and three-clusters solution. The interpretation process has identified the factors as *Narrative of the personal story* and *Action*. Three clusters have emerged, labeled *Bonding*, *Transforming* and *Educating*. As discussed, this qualitative data supports the idea that psychological distress emerging from the human relationship with the natural environment is a matter of identity, personal values and attachment to place.

Keywords: Eco-psychopathology, nature, qualitative data, identity, environment, interview.

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Introduction

According to the World Health Organization, climate change should be considered as one of the main public health issues of the 21st century (Sheehan *et al.*, 2017). In the last decade, researchers focused on its psychological consequences, with the identification of several clinical syndromes labeled eco-anxiety, eco-guilt, solastagia, eco-pain and eco-depression (Albrecht, 2005; Cunsolo & Ellis, 2018; Clayton, 2020; Clayton & Karazsia, 2020).

Research on the psychological consequences of climate change focused especially on extreme weather phenomena such as earthquakes, tsunamis, cyclones, storms, and floods. Literature supports the idea that extreme weather events and environmental changes are closely associated with a wide range of acute and/or chronic emotional responses including sadness, distress, fear, and helplessness (Cunsolo & Ellis, 2018). Vestal (2017) highlighted the impact of extreme weather conditions on mental health, with an increase of anxiety disorder, depression, violence and suicide. Advancing this line of research, several theoretical and empirical contributions focused on specific variables accounting for eco-psychopathologies, such as climate concern, anxiety or ecological pain (Clayton, 2003; Cunsolo & Ellis, 2018; Ojala, 2021).

Literature defines climate anxiety as a concern or a fear arising from uncertainty about issues related to the future of the environment (Clayton, 2020; Pihkala, 2020; Hickman *et al.*, 2021). Climate anxiety is positively related to generalized anxiety and depression (Wullenkord *et al.*, 2021), impacting individuals' quality of life (Clayton & Karazsia, 2020). In addition, research has showed that this concern predominantly affects young people (Clayton & Karazsia, 2020), suggesting that the onset of eco-psychopathologies is likely to be age-related. However, the reason why climate concerns would affect younger people more than others is not clear.

Also, climate anxiety is strongly associated with ecological grief, linked to environmental deterioration and destruction of beloved places (Ellis & Albrecht, 2017; Ojala, 2021). Studies documented ecological grief in individuals who lost their home after environmental disasters or in response to ecological changes occurred over time (Cunsolo & Ellis, 2018). Other authors observed ecological grief in

people who have a lifestyle closely connected to the environment, such as Australian farmers and Inuit living in Canada, suggesting that this eco-psychopathology may be related to identity issues (Cunsolo & Ellis, 2018). Specifically, in these population, the pain associated with ecological grief would arise from the anticipation of future ecological losses (Cunsolo & Ellis, 2018). From this perspective, the concept of ecological grief appears similar to the notion of solastalgia, defined by Albrecht (2005) as "the pain associated with the awareness that beloved place is under immediate attack".

Despite these interesting results, a recent systematic review on solastalgia (Galway *et al.*, 2019) has concluded that, to date, no appropriate assessment tools for measuring these constructs are available. This gap may be explained by the fact that, despite a increase of the number of studies about the development of psychopathological conditions in response to climate change, the influence of emotions related to the natural environment on mental health is still unclear (Stanley *et al.*, 2021). Indeed, the lack of a clear conceptual definition of these variables and the consequent lack of assessment tools hinder the soundness of the conclusions drawn by empirical studies. Consequently, efforts are needed to investigate the nature of eco-psychopathologies and the variables accounting for these forms of psychological distress to contribute to the advancement of theoretical conceptualizations of the field. In addition, eco-psychopathologies are still under-studied in several geographical areas including Italy. As highlighted in recent reviews (Middleton *et al.*, 2020; Robison *et al.*, 2022), the field of research needs more culturally oriented investigations.

The present study aims to fill some gaps, through an exploratory study, identifying the nature of psychological distress resulting from the relationship between the individual and the natural environment. Indeed, there is currently a lack of qualitative studies analyzing the psychological distress that can result from the relationship between individuals and the nature. Such studies would be relevant preliminary steps to shape future research directions on environmental psychological distress. Also, the study focuses on a sample of Italian adults, considered here a potential at-risk population for eco-psychopathologies' onset in light of the high exposure of the Italian territory to

environmental changes (Institute for Environmental Protection and Research, 2021). Indeed, according to institutional reports (ISPRA; 2021), Italy is exposed to a high risk of instability, landslides and floods because of its geological, morphological and hydrographic conformation. To fill these gaps, we conducted an exploratory qualitative study on a sample of Italian adults investigating the relationships between psychological distress and nature.

Method

Participants and procedures

The sample consisted of 20 Italian adults, aged between 20 and 50 years (M=24.6 years; SD=6.37; 35% male). The educational level of the sample was distributed as it follows: 15% postgraduate; 50% bachelor's degree; 35% high school degree. Regarding annual income, 45% of the sample reports to earn between €36,000 and €70,000 per year, 10% between €70,000 and €100,000, 35% less than €36,000 and only 5% more than €100,000. Participants were recruited between the 19th October 2022 and the 20th December 2022, through a convenience sampling technique. No compensation was offered. Participants should be between 18 and 65 years old and being Italian.

The procedure of the study has been approved by the Ethical Committee of Sapienza University of Rome (Prot. N° 0000798-2022). Participants were informed about the aims of the study and participation's conditions (e.g., anonymity and confidentiality, right to withdraw). In case the individual accepted to participate, an informed consent was subscribed before the beginning of the procedure. Then, participants were asked to fulfill a brief questionnaire and to answer the interview. The interviews were carried out in Italian, in a private place at the convenience of the informant. The interviews length ranges from 20 to 90 minutes (M_{lenght}=55 minutes). The interviews were audio-recorded and transcribed *ad verbatim*.

Measures

Socio-economic information. A form was created and administered to collect information about gender, age and socio-economic status.

Eco Psychopathologies Interview (EPI; Abate & Velotti, *in press*). The interview was developed along the lines of the Indiana Psychiatric Illness Interview (Lysaker *et al.*, 2002), that is a semi-structured interview divided into four sections, aiming to elicit illness narratives of individuals with mental disorders. Similarly, the EPI is a semi-structured interview which offers participants the opportunity to 1) share their life story; 2) describe their mental states in relation to the natural environment and the way these states have influenced their lives; 3) describe their concerns about the conditions of the natural environment and how these concerns impacted their life choices; 4) share their expectations towards the future. After a brief warming-up moment asking the interviewed to briefly summarize his/her life story, the investigation focuses on the nature of psychological discomfort related to environmental issues. It asks the interviewed to identify the causes and consequences of these experiences of distress. Specifically, consequences on the relational, occupational and lifestyle individual's functioning are investigated with separate questions. In case a change is recognized in some of these areas, the interviewed is asked to specify the nature of these changes at both cognitive and emotional level. Finally, the last questions of the EPI encouraged the individual to reflect on expectations for own future and the future of the natural environment.

Data Analysis

The analysis of the textual corpus was carried out with the T-Lab Plus 10 software version 10.1.1. Once the corpus of interviews has been imported and the language to be analyzed has been selected, the software carries out an automatic step in which text normalization, polytene selection, vocabulary construction and corpus segmentation according to punctuation, number of characters and statistical criteria take place (Lancia, 2012). Before proceeding with the selection of keywords, it is necessary to alphabetize the lexical units (words and multi-words, classified on the basis of a criterion) by grouping them under the same root. This step is essential because the software's dictionary does not allow all words to be automatically reduced to their root.

At the end of these operations, lemmatization takes place, which is later refined in the keyword (the lexical units present in the corpus) selection step. In this study, keywords were selected using the following exclusion criteria: high frequency words, adverbs and pronouns (Bolasco, 1999). After this, an evaluation of the quantitative characteristics of the corpus is carried out to check whether it is possible to process the data statistically (Bolasco, 1999; Giuliano & La Rocca, 2010).

The software is then asked to perform a thematic analysis of the elementary contexts (i.e., an automatic cluster analysis using a bisecting K-means algorithm). The algorithm is limited to 10 partitions in order to exclude all elementary contexts that do not present at least two co-occurrences. Specifically, elementary contexts are syntagmatic units (i.e., fragments, sentences, paragraphs) in which each primary document can be subdivided.

The analysis provides semantic groups (set of lemmas with similar semantic meaning) emerging from statistical elaboration of the lemmas' co-occurrences. The clusters represent the set of lexical units that share the same elementary context so that each cluster is described as a list of typical words (i.e., lexical units with the corresponding χ^2 value), and a label emerging from the qualitative interpretation of both typical words and associated elementary contexts.

The qualitative interpretation was carried out in a discussion group involving seven psychologists, including clinical and/or research

psychologists, cognitive-behavioral and/or systemic-relational psychotherapists. The first individual interpretations are shared and compared to discuss disagreement and reach a consensus.

In addition, clusters are represented in a system of coordinates (factors) which allow to determine the polarities and the discursive axes of text (positive and negative poles). Specifically, the factors represent the cultural space in which thinking is organized (Cordella, 2014). As for clusters, factors are characterized by a list of typical lemmas associated with high χ^2 values and are interpretated with the same process described above.

Results

Elementary contexts analysis

The whole corpus consisted of 63319 lemmas, 950 elementary contexts analyzed and 426 keywords. The elementary contexts analysis led to the identification of three thematic clusters. These explained 26.77%, 48.15%, and 25.08% of the variance respectively (see Table 1).

Table 1. Number of elementary contexts included in each cluster and weight percentage

Clusters	*Elementary contexts*	*Weight (χ^2)*
1. Bonding	253	26.77%
2. Transforming	455	48.15%
3. Educating	237	25.08%

Cluster 1. The first cluster labelled *Bonding* stresses the central role attributed to the *relationships* between *individual,* either *family* members or *friends* (see Table 2). In addition, the bond to natural environment seems to be shaped by these relational reference points that provided the personal values and offering *meaning* and encouraging *respect.*

Table 2. List of typical lemmas for the Bonding cluster and illustrative elementary context units

Lemmas	*χ2*
relationship	87.224
meaning	33.016
respect	32.735
individual	26.335
family	24.747
certain	22.345
friend	23.323
to start	22.456
to remain	11.243
reality	4.983
Example of elementary context units	
"[…]my first memory is when I was about two years old […] when I started going to the seaside. Of course, it's a memory linked to the happiness of meeting my family, with holidays, with the sea, with situations of joy and therefore images of sunshine and happiness […]".	
"I was really comfortable with this teacher because she had a great positive mindset […], she told me a lot and also regarding the respect of anyone and the respect of environment".	
"[…]my mother is a person who is really impacted by weather changes […] but I can say that I am thermopathic too".	

Cluster 2. The second cluster, called *Transforming* refers to the way the connection between past and current places shapes the nature of psychological problems (Table 3). Participants, when asked to describe the psychological consequences of their relationship with nature, described the *shaping* process of the childhood *house* on their *story* in the broader *world* also evidencing *differences* and *changes* of this environment as part of the psychological *problems* experienced.

Table 3. List of typical lemmas for the Transforming cluster and illustrative elementary context units

Lemmas	χ^2
house	32.69
to shape	34.13
story	28.57
world	26.14
type	25.08
related	14.50
to take	13.42
different	7.42
change	5.40
problems	4.71

Example of elementary context units

"[…] one thing that influences me a lot, but apart from the climate, it's also the environment, because I think it's something that's quite common, it's natural that being in a quiet place, maybe in the middle of the countryside or on a beach near the sea, in a situation where nature is present, and present in a positive way, it's something that makes you happy. […] but on the other hand, seeing unpleasant situations such as the latest things that happened with these devastating rains, the water bombs and landslides […] that have been caused by this crazy climate is something that makes you feel uncomfortable […]".

"[…] I used to be much more distant from plants, such as greenery. I didn't pay much attention to it. Nowadays, noticing that there are more plants in the streets which are not very well cared […] or that there aren't enough plants, it is something that makes me think about what I pay attention to. Whereas I didn't pay attention to this before, because I understand now more and more how important it is to be in contact with nature and how much benefit it gives to us […]".

Cluster 3. The third cluster, labeled *Educating*, illustrates the extent by which the psychological relationship with nature grows at *school* where it is possible to *speak* about facts regarding nature as well as to *express feelings* and learn *respect* towards nature (see Table 4).

Table 4. List of typical lemmas for the Educating cluster and illustrative elementary context units

Lemmas	*χ2*
high school	49.58
to stay	38.85
to express	36.34
emotion	31.62
to speak	25.87
school	26.86
to put	20.39
to Feel	15.01
respect	11.81
fact	7.38
Example of elementary context units	
"[…]the best years of my life were from pre-school to kindergarten, to primary school. The ones I have the most memories of […] we did a lot of things even with the teachers of extra outdoor activities […]so we planted seedlings […]."	
"[…]during lessons when I was nine years old, they taught us, in practice, how to avoid waste and so on, and I remember I became really paranoid […]."	
"[…]middle school gave me the opportunity to do a lot of things that the children might not have been able to do, even sleeping outside alone but in a controlled environment, horse riding […]."	

Factor extraction

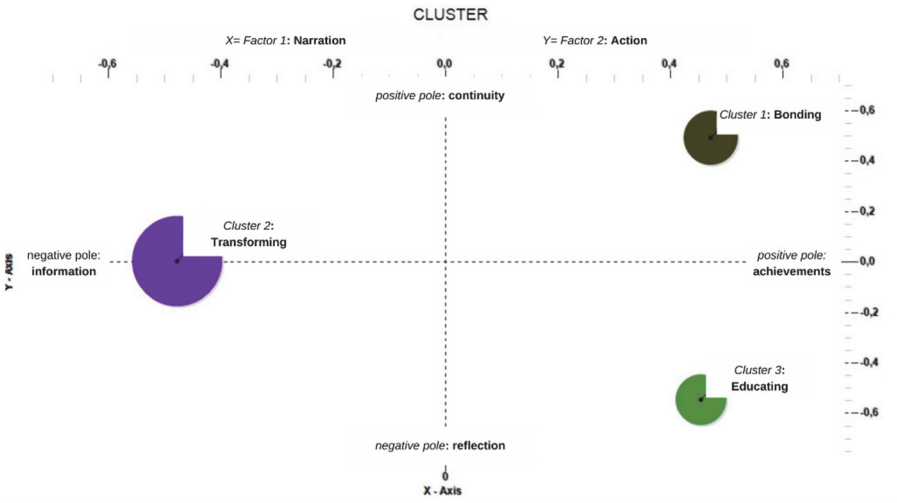
Finally, two factors were extracted and interpreted (see Table 5). Along axis 1, keywords related to the negative polarity (the terms "positive" and "negative" associated with the polarities are to be understood in a purely mathematical meaning) were related to the capacity to *connect* with and to reflect on personal story (*story*; *to remember*; see Table 5), whereas those related to the positive polarity stress the role of Continuity, being linked to as a process of identifying the impact of past events in shaping the present (*to remain*; *compared to*; *before*; see Table 5). The continuum ranging from *reflection* to *thought* was interpreted as a *Narration* that gradually develop trough a continuous re-organization of meanings attributed to own story considering the role of the environment changes. The second factor includes a positive polarity related to personal achievements (*to succeed*; *maturing*; see Table 5) and a negative polarity consisting in the description of the set of necessary information and knowledge for reaching personal achievements (*school*; *exam*; see Table 5). The interpretative process describes this factor as *Action* continuum that combines what we need to know (*information*) to reach the place where we should be (*achievements*).

Table 5. Lists of top 10 lexical units percentage of inertia explained by factors

FACTOR 1 (61,77%) Narration		*FACTOR 2 (38,23%) Action*	
POLE (-): Reflection	*POLE (+): Continuity*	*POLE (-): Information*	*POLE (+): Achievements*
to connect	to remain	middle school	relations
to make	compared to	high school	meaning
home	before	fifth	aspects
beliefs	to find	school	maturing
story	express	exam	certain
to remember	professional	emotions	job
to tell	relationships	To talk	to work
type	high school	feeling	influence
to account	to succeed	path	family
details	To start	schoolmate	to succeed

The positions of the clusters on the Cartesian axes (i.e., factors) emerging from this analysis are displayed in Figure 1. The *Bonding* cluster has a greater weight in the positive polarity of both factors, suggesting that the continuity between values' systems and relationship with nature foster achievements. The *Transforming* cluster weighs on the negative pole of factor two and is exactly halfway between the positive pole and the negative pole of the first factor. The transformative process described by this cluster therefore seems to tightly depend on the possibility to benefit from necessary information but also results as an optimal balance between reflective attitude and the need to maintain a continuity between the present and the past. Finally, the *Educating* cluster weighs more heavily on the negative polarity of the first factor and on the positive polarity of the second factor one. This suggests that the role of the educational system in shaping the human-nature relationship is primarily in fostering a reflective attitude and eliciting pro-environmental behavior rather than in providing information.

Figure 1. Graphical representation of factorial plan and clusters



Discussion

The aim of the present study was to explore the issue of psychological distress related to the relationship between individuals and natural environment through a new interview, the EPI. From the narratives elicited by the EPI, three thematic clusters were identified: *Bonding*, *Transforming* and *Educating.*

The thematic area of *Bonding* refers to the relationships and their values. This theme was related to the *Narration* factor, suggesting an association with the identity construction process (Piccinno & Fiorentini, 2015). This seems to be in line with previous theoretical perspectives stressing the relevance of the identity issue in the relationship between individuals and nature (Albrecht, 2005; Clayton, 2020). Indeed, it suggests that the development of the relationship with the natural environment may be related to the construction of individual's identity and value system. In fact, our results stress the potential relevance of the value systems in shaping the individual's relationship with nature. Of note, some authors argued that, at the basis of individuals' beliefs about the environment, there are four human values, namely, biospheric, altruistic, selfish and hedonistic values. These would be associated with concerns for the environment, for others, for one's personal resources and for well-being and pleasure respectively (Bouman *et al.*, 2018). According to these studies, beliefs, attitudes and identity aspects related to the environment correlate with values belonging to self-transcendence and self-valorization which represent openness to change and a sense of preservation (Schwartz, 1994). These values would motivate individual to engage in activities useful to others and the environment (Stern *et al.*, 1998; Schultz & Zelezny, 1999). Therefore, this cluster echoes with the definition of eco-psychopathology as an environmental concern, mostly identified in the literature as eco-anxiety (Clayton, 2020). From this perspective, environmental concerns may be rooted the development of the relationship with the environment and have implications for the construction of the individual's identity and value system.

The thematic area *Transforming* refers to the home and childhood memories and places suggesting the role of attachment to the place. In agreement with conclusions of past studies, the interruption or loss of

the attachment bond is a key factor that may lead to the development of eco-psychopathologies (Albrecht, 2005; Higginbotham *et al.*,2006, Galway *et al.*, 2019; Clayton, 2020). Of note, the construct of place attachment partially overlapped with the identity one with the first construct been described as comprising the two dimensions of place identification and place identity (Twigger-Ross & Uzzell, 1996). Place identification refers to a social identity expressed through the place in which a social group is situated or located (Twigger-Ross & Uzzell, 1996). Complementarily, the place identity construct grasps the idea that the self is not only based on the relationships the individual has with others, but also on the relationships that individuals establish with the affective and everyday places (Proshansky *et al.*, 1983; Bonnes & Secchiaroli, 1992). Qualitative data brought here suggest that it may be essential to refer to the construct of attachment to place such as the affective bond created between individuals and places to understand the nature of eco-psychopathologies (Hidalgo & Hernàndez, 2001). Indeed, the qualitative analysis of the interviews confirm the idea that individuals develop an attachment bond with everyday life places that also change over time. Unfortunately, except for the contributions focusing on solastalgia (Albrecht, 2005), there is a lack of knowledge regarding the interplay between role attachment to place and connection with nature in the explanation of psychological distress onset related to the relationship between individuals and the natural environment.

The last thematic area seems to confirm the idea of environmental-related passthrough education in contact with nature. According to some studies, although there is an innate connection to nature, this is also shaped by experiences (Kellert, 1997). Many studies confirm the idea that individuals who are more connected to nature as adults, remember having spent more time in nature during their childhood than those who are less connected to nature (Tam, 2013). Moreover, some studies suggested that contact with nature experienced during childhood impact the proneness to connect with nature in adulthood (Bang, 2007; Unsworth, 2012). This theme seems to confirm the idea that some populations, more than others, may have a higher incidence of developing eco-psychopathology because of a lifestyle that is strongly linked to the natural environment (Middleton *et al.*, 2020). This suggests that positive childhood experiences of nature may lay the

foundations for greater concern and sensitivity to the natural environment and the subsequent development of psychological distress associated with it.

Finally, the identification of the factors suggests the role of additional elements. The factor of *Narration* seems to be a process of reorganization of one's own history. The second factor would represent the need to deepen knowledge about one's own history to implement an action for changing the future. This converges with the idea that storytelling enables people to reconstruct their existence by understanding and becoming more aware of its developments (Bruner, 2006).

Limitations and conclusion

The limitations of this exploratory and qualitative study rely on the limited replicability as well as the quite small sample size. This leads to the fact that the typical words are not strongly differentiated across clusters.

Another aspect could be related to the interview itself and the poor knowledge among the interviewees regarding the phenomenon of eco-psychopathologies. Despite the current massive coverage of climate change in the mass media, several individuals claimed to not suffer from psychological issues related to the natural environment as, for example, they did not recognize anxiety regarding climate changes as a form of psychological distress. This aspect informs us regarding the relevance of the cultural framework on the way individual think and interpret the issue of eco-psychopathology and the way empirical investigations should be carried out in the Italian culture. Also, this element could direct public communication campaign that may want to stress the potential psychological consequences of climate changes.

Another aspect to consider is that narratives may also be influenced by the age of the respondent. In this respect, the literature suggests that concerns about climate change are predominant among young adults, that concerns about climate change vary according to the severity of its impact on one's life (Clayton & Karazsia, 2020). An additional aspect is related to the practical implications of the work. Particularly,

the recruitment of the sample was a critical element due to the difficulty in finding people willing to participate.

Finally, limitations to the qualitative interpretation of the clusters and factors include the educational and professional background of the discussion group participants. The homogeneity in this background may have increased the risk of bias of interpretation process.

Future Direction and implications

The present study analyzed the narratives of Italian adults regarding the relationship between psychological distress related to natural environment. The knowledge reached here may be further extended by replicating the study among vulnerable population such as individuals exposed to environmental disasters. Despite the fact that this is a qualitative study, the data obtained have several implications for future research. In fact, research could be directed towards studying the implications of the identity process and the development of the value system linked to the individual's relationship with the natural environment. Regarding clinical implications, this study may help to plan future prevention and treatment interventions focused on psychopathological conditions linked to the natural environment.

As a whole, the study suggests that eco-psychopathological symptoms converge from several factors, including identity development, the relationship that humans build over time with the environment, the attachment bond with the environment, and aspects of personality such as values' systems. Each of these identified variables should be further investigated by future qualitative and quantitative studies.

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References

Abate, R., & Velotti, P. (2023). *Eco Psychopathologies Interview (EPI)*. In press.

Ágoston, C., Csaba, B., Nagy, B., Kőváry, Z., Dúll, A., Rácz, J., & Demetrovics, Z. (2022). Identifying types of eco-anxiety, eco-guilt, eco-grief, and eco-coping in a climate-sensitive population: A qualitative study. *International journal of environmental research and public health,* 19(4), 2461. doi: 10.3390/ijerph19042461

Albrecht, G. (2005). 'Solastalgia'. A new concept in health and identity. PAN: *philosophy activism nature*, 3, 41-55.

Bang, M., Medin, D., & Atran, S. (2007). Cultural mosaics and mental models of nature. *Proceedings of the National Academy of Sciences,* 104, 13868–13874. doi: 10.1073/pnas.0706627104

Bolasco, S., Morrone, A., & Baiocchi, F. (1999). A paradigmatic path for statistical content analysis using an integrated package of textual data treatment. In *Classification and Data Analysis: Theory and Application Proceedings of the Biannual Meeting of the Classification Group of Società Italiana di Statistica (SIS) Pescara, July 3–4, 1997* (pp. 237-246). Heidelberg: Springer.

Bonnes, M.D., & Secchiaroli, G. (1992). *Psicologia ambientale: introduzione alla psicologia sociale dell'ambiente*. Roma: NIS-Carocci.

Bouman, T., Steg, L., & Kiers, H.A.L. (2018). Measuring values in environmental research: a test of an environmental portrait value questionnaire. *Frontier psychology,* 9, 564. doi: 10.3389/fpsyg.2018.00564

Bruner, J.S. (2006). *In search of pedagogy volume I: The selected works of Jerome Bruner*, 1957-1978. London: Routledge.

Clayton, S. (2003). Environmental identity: A conceptual and an operational definition. *Identity and the natural environment: The psychological significance of nature* (pp. 45-65). Cambridge (MA): MIT press.

Clayton, S. (2020). Climate anxiety: Psychological responses to climate change. *Journal of anxiety disorders,* 74, 102263. doi: 10.1016/j.janxdis.2020.102263

Clayton, S., & Karazsia, B.T. (2020). Development and validation of a measure of climate change anxiety. *Journal of Environmental Psychology*, 69, 101434. doi: 10.1016/j.jenvp.2020.101434

Clayton, S., Colléony, A., Conversy, P., Maclouf, E., Martin, L., Torres, A.C., Truong, M.X., & Prévot, A.C. (2017). Transformation of experience: Toward a new relationship with nature. *Conservation letters,* 10(5), 645-651. doi: 10.1111/conl.12337

Cordella, B., Greco, F., & Raso, A. (2014). Lavorare con corpus di piccole

dimensioni in psicologia clinica: Una proposta per la preparazione e l'analisi dei dati. *Actes JADT*, 3-6.

Cunsolo, A., & Ellis, N.R. (2018). Ecological grief as a mental health response to climate change-related loss. *Nature Climate Change,* 8(4), 275-281. doi: 10.1038/s41558-018-0092-2

Ellis, N.R., & Albrecht, G.A. (2017). Climate change threats to family farmers' sense of place and mental wellbeing: A case study from the Western Australian Wheatbelt. *Social science & medicine,* 175, 161 168.doi: 10.1016/j.socscimed.2017.01.009

Galway, L.P., Beery, T., Jones-Casey, K., & Tasala, K. (2019). Mapping the solastalgia literature: A scoping review study. *International journal of environmental research and public health,* 16(15), 2662. doi: 10.3390/ijerph16152662

Giuliano, L., & La Rocca, G. (2010). Validity and reliability of the automatic classification of texts according to the negative-positive criterion. In S. Bolasco, I. Chiari, & L. Giuliano (Eds.)*, Statistical analysis of textual data, Sapienza University of Rome, Actes des 9e`mes JADT, Rome 9–11 June* (pp. 61-72). Milan: LED.

Hidalgo, M.C., & Hernandez, B. (2001). Place attachment: Conceptual and empirical questions. *Journal of environmental psychology,* 21(3), 273-281. doi: 10.1006/jevp.2001.0221

Higginbotham, N., Connor, L., Albrecht, G., Freeman, S., & Agho, K. (2006). Validation of an environmental distress scale. *EcoHealth*, 3, 245-254.

Hwong, A.R., Wang, M., Khan, H., Chagwedera, D.N., Grzenda, A., Doty, B., Benton, T., Alpert, J., Clarke, D., & Compton, W. M. (2022). Climate change and mental health research methods, gaps, and priorities: a scoping review. *The Lancet. Planetary Health*, 6(3), e281–e291. doi: 10.1016/S2542-5196(22)00012-2

Istituto Superiore per la Protezione e la Ricerca Ambientale (2021). Il dissesto idrogeologico in Italia: indicatori di pericolosità e di rischio. *Stato dell'ambiente*. (Rapporto 356). Roma.

John, O.P., & Gross, J.J. (2007). Individual differences in emotion regulation. *Handbook of emotion regulation*, 351-372.

Kellert, S.R. (1997). *Kinship to Mastery: Biophilia in Human Evolution and Development*. Washington, DC: Island Press.

Lancia, F. (2012). *The logic of the T-LAB tools explained*. URL: http://www.tlab.it/en/toolsexplained.php.

Léger-Goodes, T., Malboeuf-Hurtubise, C., Mastine, T., Généreux, M., Paradis, P. O., & Camden, C. (2022). Eco-anxiety in children: A scoping review of the mental health impacts of the awareness of climate change. *Frontiers in Psychology,* 13. doi: 10.3389/fpsyg.2022.872544

Leiserowitz, A. (2006). Climate change risk perception and policy preferences: The role of affect, imagery, and values. *Climatic change,* 77(1-2), 45-72.

Lysaker, P.H., Clements, C.A., Plascak-Hallberg, C.D., Knipscheer, S.J., & Wright, D.E. (2002). Indiana Psychiatric Illness Interview (IPII). *APA PsycTests*. doi: 10.1037/t79888-000

Mallett, R.K., Mello, Z.R., Wagner, D.E., Worrell, F., Burrow, R.N., & Andretta, J.R. (2011). Do I belong? It depends on when you ask. *Cultural Diversity and Ethnic Minority Psychology,* 17(4), 432.

Middleton, J., Cunsolo, A., Jones-Bitton, A., Wright, C.J., & Harper, S.L. (2020). Indigenous mental health in a changing climate: a systematic scoping review of the global literature. *Environmental Research Letters,* 15(5), 053001. DOI 10.1088/1748-9326/ab68a9

Mkono, M., & Hughes, K. (2020). Eco-guilt and eco-shame in tourism consumption contexts: Understanding the triggers and responses. *Journal of Sustainable Tourism,* 28(8), 1223-1244. doi: 10.1080/09669582.2020.1730388

Moore, M.M., & Yang, J.Z. (2020). Using eco-guilt to motivate environmental behavior change. *Environmental Communication*, 14(4), 522-536. doi: 10.1080/17524032.2019.1692889

Ojala, M., Cunsolo, A., Ogunbode, C.A., & Middleton, J. (2021). Anxiety, worry, and grief in a time of environmental and climate crisis: A narrative review. *Annual review of environment and resources,* 46, 35-58. doi: 10.1146/annurev-environ-012220-022716

Palinkas, L.A., & Wong, M. (2020). Global climate change and mental health. *Current opinion in psychology,* 32, 12-16.

Piccinno, M., & Fiorentino, E. (2015). Modelli narrativi e dimensioni temporali. *Italian Journal of Educational Research,* 15, 111-130.

Proshansky, H.M., Fabian, A.K., & Kaminoff, R. (1983). Place-identity: Physical world socialization of the self. *Journal of Environmental Psychology,* 3(1), 57–83. doi: 10.1016/S0272-4944(83)80021-8

Robison, R., Van Bommel, M., & Rohse, M. (2022). Relationships between climate mitigation actions and mental health: a systematic review of the research landscape. *Frontiers in Climate*, 4, 794669. doi: 10.3389/fclim.2022.794669

Schultz, P.W., & Zelezny, L. (1999). Values as predictors of environmental attitudes: Evidence for consistency across 14 countries. *Journal of environmental psychology,* 19(3), 255-265.

Schwartz, S.H. (1994). Beyond individualism/collectivism: New cultural dimensions of values. In U. Kim, H. C. Triandis, Ç. Kâğitçibaşi, S.-C. Choi, & G. Yoon (Eds.), *Individualism and collectivism: Theory,*

method, and applications (pp. 85–119). Thousand Oaks (CA): Sage Publications, Inc.
Sheehan, M.C., Fox, M.A., Kaye, C., & Resnick, B. (2017). Integrating health into local climate response: Lessons from the US CDC Climate-Ready States and Cities Initiative. *Environmental health perspectives*, 125(9), 094501.
Stanley, S.K., Hogg, T.L., Leviston, Z., & Walker, I. (2021). From anger to action: Differential impacts of eco-anxiety, eco-depression, and eco-anger on climate action and wellbeing. *The Journal of Climate Change and Health,* 1, 100003. doi: 10.1016/j.joclim.2021.100003
Stern, D.N., Bruschweiler-Stern, N., Harrison, A.M., Lyons-Ruth, K., Morgan, A.C., Nahum, J.P., Sander, L., & Tronick, E.Z. (2001). Die Rolle des impliziten Wissens bei der therapeutischen Veränderung. Einige Auswirkungen entwicklungspsychologischer Beobachtungen für die psychotherapeutische Behandlung Erwachsener [The role of implicit knowledge in therapeutic change. Some implications of developmental observations for adult psychotherapy]. *Psychotherapie, Psychosomatik, medizinische Psychologie*, 51(3-4), 147–152. doi: 10.1055/s-2001-12386
Tam, K. (2013). Concepts and measures related to connection to nature: Similarities and differences. *Journal of environmental psychology*, 34, 64–78. doi: 10.1016/ j.jenvp. 2013.01.004
Tam, K. (2013). Dispositional empathy with nature. *Journal of environmental psychology* 35, 92–104. doi: 10.1016/j.jenvp.2013.05.004
Twigger-Ross, C.L., & Uzzell, D.L. (1996). Place and identity processes. *Journal of environmental psychology,* 16(3), 205-220. doi: 10.1006/jevp.1996.0017
Unsworth, S.J., Levin, W., Bang, M., Washinawatok, K., Waxman, S.R., & Medin, D.L. (2012). Cultural differences in children's ecological reasoning and psychological closeness to nature evidence from menominee and european american children. *J. Cogn. Cult.*, 17–29. DOI: 10.1163/156853712X633901
Vestal C. (2017). 'Katrina brain': the invisible long-term toll of megastorms. POLITICO. http://www.politico.com/agenda/story/2017/10/12/psychological-toll-natural-disasters-000547.
Vestal, C. (2017). Psychological trauma is invisible long-term toll of megastorms. *Miami Herald*, 1A, 2A.
Wang, X., Van der Werff, E., Bouman, T., Harder, M.K., & Steg, L. (2021). I am vs. we are: how biospheric values and environmental identity of individuals and groups can influence pro-environmental behaviour. *Frontiers in Psychology*, 12, 618956. doi: 10.3389/fpsyg.2021.618956
World Health Organization (WHO) (2017). *Calls for urgent action to protect*

health from climate change—sign the call. 2015. http://www.who.int/globalchange/global-campaign/cop21/en/

Wullenkord, M.C., Tröger, J., Hamann, K.R., Loy, L.S., & Reese, G. (2021). Anxiety and climate change: a validation of the Climate Anxiety Scale in a German-speaking quota sample and an investigation of psychological correlates. *Climatic Change,* 168(3-4), 20. doi: 10.1007/s10584-021-03234-6