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The Greater the Contact, the Closer the Threat: The Influence of Contact with Nature on the Social Perception of Biodiversity Loss and the Effectiveness of Conservation Behaviours

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Abstract: The public awareness of biodiversity loss is growing; however, citizens still engage in behaviours that are harmful to ecosystems, such as buying products shipped from across the world. Exploring the public's understanding of biodiversity loss is fundamental to promoting behavioural change. To this purpose, we carried out two studies to test whether the psychological distance of biodiversity loss influences citizens' shared ideas about biodiversity, depending on individuals' contact with nature, and how this can influence conservation behaviours. Study 1 (n = 261) demonstrated that the public's shared ideas are organised around two axes, one relating to psychological distance and contact with nature, and one concerning the level of specificity of the terms used. Study 2 (n = 178) confirmed that the perception of biodiversity loss as a distant threat is related to weaker engagement in pro-environmental behaviours. The findings are discussed in terms of their innovative theoretical contributions and their potential practical implications.

Keywords: psychological distance; contact with nature; biodiversity loss; pro-environmental behaviour; decision-making; public understanding of science

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1. Introduction

Biodiversity loss is publicly recognised as a global environmental challenge [1,2]. This has severe negative consequences for ecosystem services [3,4]. Strategies to enhance and protect urban biodiversity are implemented by governments and field organisations [5,6], but for the success of many of these strategies, the cooperation, interest, and involvement of local residents are fundamental [6,7]. Even if public awareness of this issue is growing (Special Eurobarometer 436, 2015), species extinction is still occurring due to human activity [8,9]; troublesome examples include insect decline and loss of pollinators [10–12].

Several studies have investigated how individuals justify the non-adoption of pro-environmental behaviours and even the maintenance of behaviours contributing to climate change. Still, to our knowledge, no study has analysed the psychological barriers to adopting a lifestyle that is respective of both biodiversity and ecosystems. To justify inaction in the face of climate change, for instance, individuals tend to refer to their incertitude or scepticism concerning climate change [13,14]. Mistrust in the source of information, and more specifically in the press and the government, also increases the individual's sense of uncertainty [13]. A recurring argument for justifying inaction refers to individuals' perceptions of powerlessness, which is the idea that their own actions are too small to really produce any difference [13,15] and can be used to resolve the incongruences between their attitudes and their behaviours. Similarly, some individuals adopt a fatalistic vision of environmental degradation, thinking it is too late to act [13,14] or that technological solutions could save the situation [13,15].

Psychological distance is an important factor that intervenes in an individual's decision to change their behaviour in order to respond to a specific threat. Indeed, psychological distance refers to people's perception of the distance or proximity of a specific object or threat across several dimensions: geographic (spatial distance between the event/object and the perceiver), temporal (time between the object/event and the perceiver), social (perceived similarities between the other and the self), and uncertainty (perceived likelihood of an event). Risk perception is the first step of the decision-making process, bringing individuals to adopt or not to adopt a specific behaviour, as presented in several socio-cognitive models explaining individuals' decision-making [16–18]. As such, risk perception can be a strong barrier to or motivator of behavioural change. According to the extended parallel process model [18,19], the less individuals feel threatened, the less they will be motivated to find a behavioural response to such a threat. Indeed, when individuals do not feel concerned about a threat, they are not interested in looking for a behavioural alternative to facing it. On the other hand, if individuals do perceive a high threat, they evaluate different alternatives to find the most effective and easy way to respond to such a threat.

The research has demonstrated that people perceive climate change as a psychologically distant threat [20,21], something that happens in some distant future (temporal distance), far away (geographical distance), and to other people (social distance). This is problematic because it limits individuals' involvement in mitigation (e.g., adopting low-emission vehicles, energy-saving behaviours, buying products with low greenhouse gas emissions during production and transport) as well as adaptation actions (heat protection, flood protection) [22–27].

It is clear that a vast amount of research has analysed individuals' perceptions of climate change; however, biodiversity loss and conservation remain less investigated. It is important to consider that climate change and biodiversity loss are two related but different issues, which are not treated in the same way by society and are not perceived in the same way by individuals. For instance, the two environmental issues have different places in the media, with climate change receiving much more attention than biodiversity loss (a difference of up to eight to one in anglophone journals in 2016 [28]). The public perception of these two environmental issues is also quite different: climate change is a threat that individuals are mainly aware of, whereas biodiversity loss is often linked to a wider diversity of meanings, often poorly understood by the public [29–31] or not mentioned when thinking about environmental threats [32]. This is why it is important to further analyse the psychological barriers to biodiversity conservation as a separate issue from climate change, as the levers and barriers could indeed be different. For instance, it has been demonstrated that biodiversity conservation behaviours are determined in part by individuals' perceptions of being close to nature, which are directly influenced by individuals' experiences of nature during their lifetimes [33]. Indeed, past research has demonstrated that pro-environmental behaviours are more likely to occur for individuals who report to have been in contact with nature, including recreational contact with nature (e.g., birdwatching and fishing [34]) and active engagement and interaction with nature (such as gardening or picking flowers [35]) as well as mere exposure to nature (e.g., walking or camping [36]).

This article proposes an understanding of what the shared ideas of biodiversity loss are, with particular attention paid to the perceived distance of this phenomenon, and to identify how this can vary depending on individuals' exposures to urban nature in their everyday life, as well as how this can influence conservation behaviours.

In the following section, a review is presented concerning past research on the public's understanding of biodiversity and the role that the individual's contact with nature within a city plays.

1.1. Public Understanding of Biodiversity and Biodiversity Loss

We adopt a constructivist perspective of the public's understanding of nature and biodiversity, when we consider it in relation to the context, environmental practice, and

experience of a group. In this sense, even if social representations are based on novel ideas often proposed by scientific bodies, "'real' is what people believe to be real according to their actions—their paramount reality" ([37], p. 345). Through this group-bound reality, groups are able to "translate" new scientific ideas into more familiar terms [38], a process that also includes the rationalisation of elements that might be perceived as threatening to locals' self-esteem, efficacy, continuity, and distinctiveness [39].

The practical consequence of this conception of social knowledge is that even though scientific knowledge and social representations pertain to different universes—reified and consensual, respectively—the former is here not regarded as "superior" or a purer form of knowledge that is distorted when it is integrated in social representations [37]. "Social representations of science mediate between the science world and the life world, bridging the 'gap' by transforming expert knowledge into hybrid forms drawing on both science and the life world" ([40] p. 166).

Despite the numerous critics of the so-called "deficit models" of science communication [37,40,41], these approaches are still commonly found in applied studies [40,42]. In the field of biodiversity these studies have for example described a "deficiency" in lay people's knowledge of scientific definitions [43,44] and, as a result, have suggested that the public needs to be "better educated" [45,46].

From a social representations perspective, Buijs et al. [47] argue that lay people's definition and understanding of biodiversity are not in the same category as scientific definitions but derive from lay people's daily practice and experiences as well as their emotions and knowledge of their surroundings, which help them perceive biodiversity. In general, research focuses on public knowledge and perception of the ecosystem services and disservices, rather than on biodiversity per se (for a review, see [48]). The little research that has been carried out on the public understanding of biodiversity has mainly focused on specific ecosystems, such as forest biodiversity, marine biodiversity, or urban biodiversity. For instance, a qualitative study about public perception of forest biodiversity [49] shows that about 80% of respondents are familiar with the term biodiversity and have a good understanding of their environment, forest biodiversity, and ecological concepts such as ecosystem equilibrium, nutrient cycles (food chain), and natural dynamics. The public perception of the marine environment has also been investigated [50] and it has been shown that perceptions of marine biodiversity quality and marine ecosystem governance and management are generally poor [51–53]. With regard to urban biodiversity, research in this area has focused on how citizens conceptualize ecosystem services associated with urban nature [54,55], as well as ecosystem disservices within cities, e.g., from nuisance animals, vehicle–wildlife collisions, or pollen and other plant allergens [56]. Recently, Campbell-Arvai [57] interviewed the general public, asking for a definition of urban biodiversity, as well as the perceived benefits, costs, and threats related to urban biodiversity, and compared their answers to experts. Most interviewees in this study were able to provide a basic definition of biodiversity, where "nature" was often substituted by "biodiversity". Prévot et al. [58] also demonstrated that the term "nature" rather than "biodiversity" facilitates public understanding. With respect to the loss of urban biodiversity, while experts describe the systemic drivers of habitat degradation in urban centres (e.g., invasive species, the runoff of pollutants into the soil, and habitat loss), citizens focus on the contribution of individuals and households to habitat degradation (e.g., vandalism, littering, and feeding wildlife) [57,59].

These social representations of nature and biodiversity, while socially shared, allow the emergence of particular patterns of self—other relationships identifiable through discourse [60], observation [61], and other types of multi-dimensional analysis. These propositions of self–other relationships are often protective of one's identity and self-esteem [39,62]. If this line of research has produced fruitful descriptions of how common it is for people to downplay possible local threats to their self-identity [63], little is known about how the proximity with an environment—self-environment relation—is associated with what type of shared representations. The past research has, for instance, demonstrated that lay people

associate nature especially with descriptive elements, such as animals, trees, and plants, and to a lesser extent with beauty and health, whereas professionals used more evaluative notions [39], mentioning beliefs (such as autonomy and unspoiled) and normative ideas about nature (such as protection), but also experiential notions, such as peace, joy, and fascination. This was connected with participants' attitudes towards conservation: while a normative representation of biodiversity correlated positively with a focus on the importance of conserving the ecosystem holistically (rather than individual animals and species), a descriptive representation correlated negatively. Indeed, representations of nature inform attitudes on nature restoration [64], wolf protection schemes [65], and invasive species management [66].

To our knowledge no study has yet analysed how the perceived proximity (threat of) to biodiversity loss is associated with how it is represented. We expect that individuals will put forth different elements of the shared ideas of biodiversity in relation to their (past and present) contact with nature (Study 1), which would in turn be associated with different types of conservation practices (Study 2).

1.2. The Influence of Contact with Nature

The past research has demonstrated that individuals' experiences of and contact with nature positively influence their attitudes and behaviours. Kals, Schumacher, and Montada [67] reported a modest but significant correlation between the time spent in nature from age 7 to 12 and adulthood "indignation about insufficient nature protection", which was in turn predictive of their willingness to engage in nature-protective behaviours. Lohr and Pearson-Mims [68] demonstrated that childhood activities such as taking care of plants as well as having grown up living next to a garden or flower bed were among the most significant predictors of an adulthood positive perception of plants and trees. Ewert, Place, and Sibthorp [69] interviewed undergraduate students and found that appreciative outdoor activities (e.g., time outdoors enjoying nature) and consumptive outdoor activities (e.g., hunting and fishing) during one's youth were predictive of later life eco-centric versus anthropocentric beliefs. In a study by Wells and Lekies [70], the results suggest that childhood participation with nature may set an individual on a trajectory toward adult environmentalism. Specifically, childhood participation in "wild" nature such as hiking or playing in the woods, camping, and hunting or fishing, as well as participation with "domesticated" nature such as picking flowers or produce, planting trees or seeds, and caring for plants in childhood have a positive effect on adult environmental attitudes.

This review of the literature demonstrates how the self–environment relation influences individuals' attitudes; however, the effects of contact with nature on pro-environmental behaviour is far less established. We argue that current and past experiences of contact with nature influence individuals' perception of biodiversity, the perceived psychological distance of biodiversity loss (Study 1 and 2), and their engagement in biodiversity conservation behaviours (Study 2).

1.3. Objectives of the Present Research

The research we present in this paper aims to understand the connection between the perceived risk of biodiversity loss and biodiversity conservation behaviours, taking into consideration the possible effects of present and past experiences of contact with nature. For the purposes of this paper, we define as "experiences of contact with nature" both voluntary exposure to nature (walking in a city park or a wooded area) and involuntary exposure to nature (living or growing up next to a park, woods, or in a home with a garden). More precisely, our work aims to answer two research questions:

RQ1: How do past and previous contact with nature influence shared ideas about biodiversity and in the particular psychological distance of biodiversity loss? (Study 1)

RQ2: Does psychological distance of biodiversity loss influence biodiversity conservation behaviours? Does this vary depending on past and previous contact with nature? (Study 2)

The data that support the findings of these studies are available from the corresponding author, upon reasonable request. The data were collected, saved, and analysed according to the latest General Regulation on Data Protection.

2. Study 1

The main objective of Study 1 was to understand how the shared ideas about biodiversity are shaped by the contact that individuals have with nature, either living and/or growing up next to nature (for instance, in a home with a garden or close to a forest) or by voluntarily taking frequent walks in nature. A secondary objective was to explore whether the psychological distance perceived by individuals when thinking of biodiversity loss also contributes towards shaping the shared ideas about biodiversity in general. To these purposes, we created a questionnaire combining scales and open-ended questions.

2.1. Materials and Methods

2.1.1. Measures

The questionnaire started with a free-association task as a method to assess the ideas people tend to more easily associate with biodiversity [59]; the participants were asked to name the three words or expressions that first came to mind when they thought of the word "biodiversity". These words were then coded, following a double-blind procedure (two different judges assigned each word to a specific category and then collegially harmonised their evaluations), into 7 categories:

- "Nature" (31.7%), including all general words relating to nature, e.g., "life" and "environment" and "nature" itself;
- "Fauna" (15.9%), relating to words associated with wildlife, e.g., "panda" and "animals";
- "Flora" (10.7%), relating to words associated with vegetation, e.g., "flowers", "plants";
- "Scientific terms" (21.8%), concerning specific terms relating to biodiversity, e.g., "variety", "ecosystems", and "species";
- "Science" (7.1%) included terms relating to scientific fields, such as "zoology";
- "Risk" (6.9%), including words relating to biodiversity loss, such as "extinction";
- "Preservation" (5.8%) included terms relating to biodiversity conservation, such as "saving" and "respect".

The participants were then asked to respond to a 12-item scale (α (N = 12) = 0.89) measuring the four dimensions of the psychological distance of biodiversity loss: geographical (α (N = 3) = 0.79; e.g., "Biodiversity loss is more likely to impact countries far away"), temporal (α (N = 3) = 0.81; e.g., "Biodiversity loss is an immediate threat affecting people right now"), social (α (N = 3) = 0.81; e.g., "Biodiversity loss is likely to have a big impact on people like me", item reversed), and uncertainty (α (N = 3) = 0.72; e.g., "I am certain that biodiversity is really happening", item reversed).

In the final section of the questionnaire, the individuals supplied personal characteristics regarding their gender, age, and contact with nature (past and present), including the "involuntary" contact such as whether they live and/or grew up close to nature (to which participants had to answer "yes" or "no"), as well as their "voluntary" contact with nature, measured by asking how often they voluntarily go for a walk in nature (on a 5 point scale, going from 1—Never to 5—Always).

The participants were then thanked and fully debriefed.

2.1.2. Procedure

The participants were recruited online, through publishing a post on social media groups not directly involved with environmental protection, over a period of 4 months (June 2020–September 2020). The participants completed the questionnaire online, their participation was anonymous and voluntary; the data were collected and analysed in the respect of the latest General Regulation on Data Protection.

2.1.3. Participants

The sample included 261 participants living in urban areas in France, aged from 18 to 69 years old (M = 29.9, SD = 9.77), 45% men, and 55% women; 70% of the participants declared that they currently live and 71% declared they grew up close to a wood or a park or in a home with a garden.

2.1.4. Data Analysis Plan

At first, we carried out a Multiple Correspondence Analysis (MCA). In order to include the four psychological distance dimensions in the factorial analysis, they were first transformed into dichotomous variables based on the answer distribution: 2 meant "distant" and 1 meant "close". We also included in the MCA the variables concerning the involuntary (living/growing up close to nature: 1 meant "close" and 2 meant "far") and voluntary (nature walk: 1 meant "Walks often in nature" and 2 meant "Walks rarely in nature") contact with nature. In a second moment, we carried out linear regression analyses to test whether participants' contact with nature is predictive of the four dimensions of psychological distance (as continuous variables).

2.2. Results

2.2.1. MCA: Psychological Distance and Shared Ideas about Biodiversity

The coded responses from the free-association task are attributed as categorical variables to each of the participants. These free-association results, together with the four psychological distance profiles, and (voluntary and involuntary) nature experiences were all submitted to an MCA.

The two most explanatory dimensions together explain 32.4% of the variance (Tables 1 and 2). Dimension 1 accounts for 19.4% of the variance and reflects the two basic and opposed poles of psychological closeness and distance and is represented in Figure 1 as the horizontal axis. The variables significantly contributing to dimension 1 in a positive way (on the right quadrants of Figure 1) are associated with psychological "closeness"—geographical, social, temporal, and certainty. The idea of risk is also part of this group of variables, which can be interpreted as a concern typical of those participants who live or grew up close to natural settings. From the negative side (on the left quadrants of Figure 1), Dimension 1 is characterised by psychological distance: here we see a significant contribution of geographical, temporal, social, and certainty distance. This dimension was therefore labelled biodiversity loss as "close vs. distant".

Table 1. Dimensions explaining the response categories of biodiversity.

Dimension	Cronbach Alpha	Inertia	% of Explained Variance
Close vs. distant	0.681	0.194	19.4
Scientific vs. stereotypical	0.487	0.130	13.0
Total		0.32	32.4

Dimension 2 accounts for 13.0% of the variance. This dimension represents more than the first dimension the ideas participants attributed to biodiversity and is represented in Figure 1 as the vertical axis. From the positive side, on the top quadrants of Figure 1, we see the representation of rich and detailed observation of biodiversity dynamics through ideas as "variety", "organisms", and "ecosystems" (scientific terms). These ideas appear alongside other variables supporting the interpretation that these complex descriptions are associated with a closer experience of nature: living and growing up close to nature. From the negative side, on the bottom quadrants of Figure 1, Dimension 2 represents more stereotypical ideas associated with biodiversity through general terms such as "plants" and "animals". This pole also represents variables of psychological distance: living far and growing up far from nature. This dimension has therefore been labelled as "scientific vs. stereotypical" aspects of biodiversity.

Table 2. Discrimination measures per contributing factor (Study 1). Points contributing more than the dimension inertia are presented in bold.

	Dimension		Mean
	1	2	
Cat 1 nature/environment/life	0.000	0.001	0.000
Cat 2 animals	0.039	**0.597**	0.318
Cat 3 plants	0.025	**0.393**	0.209
Cat 6 science/ecology/biology	0.082	0.008	0.045
Cat 14 preservation	0.050	0.055	0.053
CScientificTerms	0.049	**0.129**	0.089
CRisk	**0.190**	0.007	0.098
NatureWalk	0.118	0.050	0.084
GeographicalDistance	**0.302**	**0.108**	0.205
TemporalDistance	**0.613**	0.040	0.327
SocialDistance	**0.584**	0.017	0.300
UncertaintyDistance	**0.503**	0.076	0.289
LivingCloseToNature	0.114	**0.159**	0.136
GrowingUpCloseToNature	0.050	**0.189**	0.120
Active total	2.719	1.827	2.273

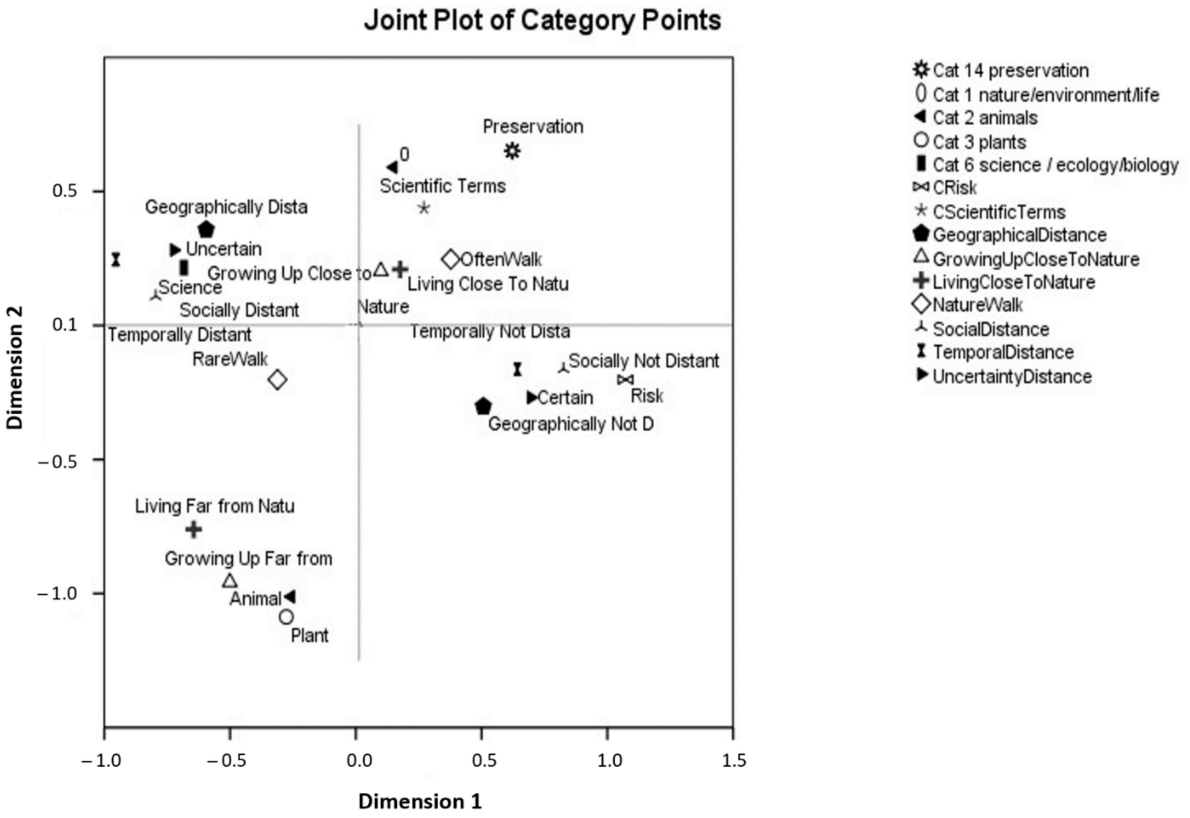

Figure 1. Joint MCA plot of biodiversity shared ideas and psychological distance (social, temporal, certainty and geographical).

The plot representation of these two dimensions simultaneously allows us to identify four main profiles of individuals depending on their psychological distance of biodiversity loss and the ideas they associate to this concept (Figure 1). A first profile, with a positive contribution of the first dimension, presents ideas of biodiversity loss as a certain and close threat. Biodiversity loss is perceived as psychologically close at a geographical, temporal, and social level and is associated with the following ideas: "risk", "loss", and "extinction".

This is also a group that is more associated with the negative pole of the second dimension, representing concerns for biodiversity by means of a concrete definition.

A second profile appears on the negative side of the first dimension. It consists of respondents who perceive biodiversity loss as an uncertain, distant threat on a social, temporal, and geographical level. Associated with these ideas of biodiversity loss as distant is the fact that these participants tend to rarely walk in nature.

The third profile presents a negative contribution to the second dimension. It is associated with the participants who have grown up and are currently living far from nature. These individuals associate the word "biodiversity" with concrete and stereotypical definitions, such as "animals" and "plants".

The fourth group presents a positive contribution to the second dimension. These responses are associated with respondents who declare often walking in nature and who think "biodiversity" through more abstract definitions, i.e., "ecosystems", "organisms", associating concepts such as biodiversity "preservation" and "conservation".

These results suggest that the ideas that individuals freely associate to the phenomenon of "biodiversity loss" differ depending on their perception of such a phenomenon as being close or far, as well as on their scientific knowledge of the concept of biodiversity. For instance, the concept of "risk" is associated with the perceived closeness of biodiversity loss, whereas the concept of "preservation" is associated with both the perceived closeness and a scientific knowledge of biodiversity. These findings also suggest an association between individuals' experiences of contact with nature and the psychological distance of biodiversity loss, which is further explored through regression analyses.

2.2.2. The Influence of Contact with Nature on Psychological Distance

The results are reported in Table 3. We observe a significant impact of the voluntary contact with nature ("Nature walk") on all the dimensions of psychological distance: the more individuals declare to frequently and voluntarily go for a walk in nature, the more they perceive biodiversity loss to be a certain and close threat at a geographical, temporal, and social level.

Table 3. The influence of contact with nature on each dimension of psychological distance (Study 1).

Block	Predictors	Geographical		Temporal		Social		Uncertainty	
1		r^2 = 0.007; F = 1.91		r^2 = 0.002; F = 1.31		r^2 = 0.008; F = 2.01		r^2 = 0.02; F = 3.59	
		β	t	β	t	β	t	β	t
	Age	−0.11	−1.77	−0.02	−0.23	−0.08	−1.25	0.002	0.03
	Gender	−0.03	−0.49	−0.09	−1.53	−0.08	−1.32	−0.16	−2.64 *
2		r^2 = 0.04; F = 2.89		r^2 = 0.08; F = 5.45		r^2 = 0.07; F = 4.95		r^2 = 0.07; F = 4.68	
	Age	−0.11	−1.75	−0.02	−0.28	−0.08	−1.28	−0.001	−0.02
	Gender	−0.03	−0.49	−0.11	−1.69	−0.09	−1.42	−0.17	−2.79 *
	Living close to nature	0.08	1.19	0.09	1.43	0.11	1.61	0.07	1.05
	Growing up close to nature	0.05	0.71	0.14	2.17 *	0.09	1.46	0.13	1.92
	Nature walk	−0.14	−2.16 *	−0.17	−2.73 *	−0.17	−2.68 *	−0.13	−2.12 *

* $p < 0.05$.

3. Study 2

Following the results of Study 1, demonstrating that indeed contact with nature influences the psychological distance of biodiversity loss, which is a main factor shaping the shared ideas about biodiversity, we carried out Study 2 to understand how this can

influence individuals' engagement in biodiversity conservation behaviours. To this purpose, a new questionnaire was developed.

3.1. Materials and Methods

3.1.1. Measures

The questionnaire started by asking participants to respond to the same 12-item scale (α (N = 12) = 0.87) used in Study 1, measuring the four dimensions of the psychological distance of biodiversity loss: geographical (α (N = 3) = 0.75), temporal (α (N = 3) = 0.74), social (α (N = 3) = 0.81), and uncertainty (α (N = 3) = 0.64). To measure conservation behaviours, the participants were asked how frequently they limited their consumption of disposable products and their consumption of water and how frequently they bought regional and eco-label products on a 5-point scale going from 1—never to 5—always. The questionnaire ended by asking individuals' personal characteristics with regard to their gender, age, and their present and past contact with nature, as in Study 1.

3.1.2. Procedure

The participants were recruited online, through publishing a post on social media groups not directly involved with environmental protection, over a period of 4 months (June 2020–September 2020). The participants filled the questionnaire online, their participation was anonymous and voluntary; the data were collected and analysed in the respect of the latest General Regulation on Data Protection.

3.1.3. Participants

The sample included 178 participants, living in urban areas in France, aged from 18 to 65 years old (M = 28.8, SD = 9.2), and was 42% men and 58% women; 60% declared to currently live and 51% to having grown up close to a wood or a park or in a home with a garden.

3.1.4. Data Analysis Plan

The linear regression analyses were carried out to first confirm whether the influence of the contact with nature on psychological distance and conservation behaviour and, second, to test the influence of psychological distance on conservation behaviours. The influence of gender and age was controlled in all analyses.

3.2. Results

3.2.1. The Influence of Contact with Nature on Psychological Distance

The regression analyses were carried out to analyse the impact of contact with nature on the different dimensions of psychological distance. All the β and t values are reported in Table 4.

The results confirm that the voluntary contact of nature (Nature walk) had a significant effect on all dimensions of psychological distance: the more individuals declared to go for a walk in nature settings, the more they perceived biodiversity loss to be a certain and close threat at a geographical, temporal, and social level.

3.2.2. The Influence of Psychological Distance on Conservation Behaviours

The regression analyses were carried out to analyse the influence of contact with nature and psychological distance on the intention of individuals to engage in the different conservation behaviours. All the β and t values are reported in Table 5.

Table 4. The influence of contact with nature on each dimension of psychological distance (Study 2).

Block	Predictors	Geographical		Temporal		Social		Uncertainty	
1		$r^2 = -0.008$; F = 0.27		$r^2 = -0.002$; F = 0.81		$r^2 = -0.01$; F = 0.09		$r^2 = -0.001$; F = 0.89	
		β	t	β	t	β	t	β	t
2	Age	0.05	0.63	0.09	1.14	0.03	0.38	0.09	1.23
	Gender	−0.04	−0.48	−0.06	−0.75	0.01	0.13	−0.06	−0.74
		$r^2 = 0.07$; F = 3.73		$r^2 = 0.11$; F = 5.16		$r^2 = 0.12$; F = 5.68		$r^2 = 0.08$; F = 4.01	
	Age	0.03	0.35	0.06	0.82	0.008	0.11	0.07	0.96
	Gender	−0.02	−0.27	−0.03	−0.45	0.04	0.49	−0.04	−0.53
	Living close to nature	0.05	0.54	0.11	1.28	0.06	0.76	0.05	0.61
	Growing up close to nature	−0.06	−0.71	−0.08	−0.92	−0.04	−0.43	−0.06	−0.77
	Nature walk	−0.31	−4.05 ***	−0.34	−4.69 ***	−0.38	−5.21 ***	−0.31	−4.04 ***

*** $p < 0.001$.

Table 5. The influence of contact with nature and each dimension of psychological distance on behavioural intentions (Study 2).

Block	Predictors	Limiting Disposables		Limiting Water		Buying Bio		Buying Regional	
		β	t	β	t	β	t	β	t
1		$r^2 = -0.004$; F = 0.63		$r^2 = -0.007$; F = 0.39		$r^2 = 0.005$; F = 1.48		$r^2 = -0.004$; F = 0.65	
	Age	−0.02	−0.29	−0.07	−0.87	0.09	1.26	0.08	1.04
	Gender	0.09	1.12	−0.01	−0.05	0.07	0.93	0.02	0.27
2		$r^2 = 0.09$; F = 4.84		$r^2 = 0.007$; F = 1.25		$r^2 = 0.06$; F = 3.18		$r^2 = 0.11$; F = 5.13	
	Age	0.01	0.1	−0.06	−0.81	0.11	1.48	0.11	1.47
	Gender	0.07	0.93	−0.01	−0.11	0.07	0.89	−0.01	−0.09
	Living close to nature	−0.07	−0.87	0.05	0.62	0.05	0.62	−0.14	−1.71
	Growing up close to nature	0.11	1.27	−0.01	−0.11	0.05	0.59	0.08	0.97
	Nature walk	0.32 ***	4.41	0.16	2.06 *	0.23	3,02 **	0.34	4.69 ***
3		$r^2 = 0.18$; F = 5.39		$r^2 = 0.21$; F = 5.92		$r^2 = 0.07$; F = 2.48		$r^2 = 0.13$; F = 3.89	
	Age	0.02	0.32	−0.04	−0.53	0.12	1.54	0.11	1.46
	Gender	0.06	0.91	−0.02	−0.27	0.07	0.91	0.002	0.03
	Living close to nature	−0.04	−0.46	0.09	1.21	0.07	0.84	−0.13	−1.54
	Growing up close to nature	0.08	1.05	−0.05	−0.61	0.04	0.44	0.07	0.89
	Nature walk	0.21	2.62 *	−0.05	−0.62	0.15	1.85	0.27	3.38 ***
	Geographical distance	0.01	0.056	−0.18	−2.25 *	−0.09	−1.02	−0.04	−0.43
	Temporal distance	−0.31	−2.83 **	−0.15	−1.36	−0.14	−1.19	−0.07	−0.636
	Social distance	−0.09	−0.98	−0.14	−1.39	−0.08	−0.77	−0.21	−2.01 *
	Uncertainty	0.07	0.67	−0.16	−1.64	0.11	0.94	0.12	1.21

* $p < 0.05$; ** $p < 0.005$; *** $p < 0.001$.

The results demonstrate that the voluntary contact of nature (Nature walk) has a significant impact on the intention to limit disposable products and to buy regional products and a tendentially significant impact on the intention to buying biological products: the

more individuals declared to go for a walk in a natural setting, the more willing they declared to be to improve their behaviours.

Moreover, temporal distance has a significant impact on the intention to limit disposable products: the closer biodiversity loss is perceived to be at a temporal level, the more individuals are willing to improve their behaviour. Similarly, geographical distance has a significant impact on the intention to limit water waste: the more individuals perceive biodiversity loss to affect areas geographically close to them, the more they are willing to improve their behaviour. Finally, social distance has a significant impact on the intention to buy regional products: the more individuals perceive biodiversity loss to be a threat for their social entourage, the more they are willing to buy regional products.

4. General Discussion

The objective of this research was to understand how individuals' experiences of contact with nature influence the shared ideas about biodiversity, with a specific focus on the psychological distance of the negative consequences of biodiversity loss, and to understand whether this shapes conservation behaviours. This is the first research offering preliminary results on the effect of contact with nature on the perceived psychological distance of biodiversity loss and biodiversity conservation behaviours.

The results from Study 1 demonstrate that the public representation of biodiversity is organised around two main axes, one concerned with individuals' experiences of contact with nature (from little to frequent contact with nature) as well as with the psychological distance of biodiversity loss (from distant to close, on all four dimensions of distance) and the second concerned with the type of words used to represent biodiversity, either concrete and simple or abstract and scientific. Other than confirming the link between contact with nature and psychological distance of biodiversity loss, these results also raise a question concerning the orthogonal relation between psychological distance (horizontal axis) and the level of scientific specificity used to describe biodiversity (vertical axis). Considering that past studies showed that professionals tend to use more scientific and abstract terms than lay people [59], this result might suggest that the level of expertise could also be orthogonal to psychological distance, possibly indicating that expertise does not influence the perceived psychological distance of biodiversity loss. Since Study 1 did not measure the level of expertise of participants, this result would need corroboration; further research should thus explore the link between the level of scientific expertise and the psychological distance of environmental risks.

The results from Study 2 confirm that voluntarily getting in contact with nature (by walking in parks and forests for instance) influences individuals' engagement in conservation behaviours: the greater the contact with nature, the more the individual professes to limiting purchases of disposable products and water consumption, while preferring the purchase of regional and bio products. This is in line with past results demonstrating that contact with nature predicts general pro-environmental behaviours [58]. The findings also show that voluntary contact with nature influences psychological distance: the more frequently an individual gets in contact with nature, the more certain and closer they perceive biodiversity loss to be at a social, temporal, and geographical level. These preliminary results could indicate that individuals who frequently get in contact with nature also observe the consequences of human activity on ecosystems and biodiversity and thus perceive the threat to be closer. Indeed, the past research has demonstrated that having a personal experience of the negative consequences of a hazard directly influences individuals' perception of the risks of such hazard [71–73]. Having a personal direct experience of a natural hazard is for instance the most important predictor of risk perception [73,74]. Further research should thus analyse if current and frequent contact with nature influences individuals' personal experiences of biodiversity loss and thus their perceptions of the psychological distance of this environmental issue.

Findings from Study 2 also suggest that different dimensions of psychological distance influence different conservation behaviours. This could be due to the specificity of the

behaviours, in terms of the perceived costs and benefits that they present [75,76], and it suggests that education and communication programs should focus on specific dimensions of the environmental risks (social, temporal, or geographical), depending on the type of behaviour promoted. These preliminary findings also contribute towards warning researchers against using general pro-environmental behaviour scales when analysing the levers and barriers to behavioural change because, even if the internal validity of the scale is good, there might be specific features of each behaviour that could cause the barriers and levers explored to have different effects.

The findings from both studies present some limitations that need to be addressed and examined in further research. The first limitation concerns the inclusion in the concept of "experiences of contact with nature" of different types of nature: the ecosystems and appearance of nature in city parks are indeed different from those of a wooded area, or a house lawn, and are not equivalent in terms of biodiversity preservation. Further research should control for possible differences due to the variability of the biodiversity and conservation-related practices in the different green spaces that characterize urban areas. A second limitation derives from the limited size of the samples collected for both studies, as well as the method used to collect the self-reported data, which prevents the generalization of our results. The findings presented in this paper should thus be considered as preliminary findings in a field that is yet little explored, the influence of contact with nature on the perception of the risks of biodiversity loss. This merits further investigation by future studies with more solid and representative samples and experimental protocols to observe actual behaviour. Another limitation concerns the impossibility to establish a causality link between contact with nature and concern for biodioversity from our correlational exploratory data. Further research should include experimental or longitudinal protocols to determine whether the link between contact with nature and biodiversity conservation is causal, or whether it is the fact that individuals are more sensitive about biodiversity loss that brings them to look for nature experiences. Furthermore, the studies presented here did not aim to test the possible influence of the socio-economic status and background of the participants, which however varies greatly within a city and has been demonstrated to be an important predictor of pro-environmental behaviours [77,78]. Future research on the influence of voluntary and involuntary experiences of contact with nature within an urban context should verify the influence of the socio-economic status of participants. The instructions and questions used for both studies are presented in the Supplementary File attached to this article.

This research presents important theoretical contributions and points to interesting practical implications. On one hand, our preliminary findings suggest that the psychological distance perceived by individuals regarding biodiversity loss is strictly connected to individuals' contact with nature and both shape individuals' perceptions of biodiversity in general. If corroborated by more representative samples, this would also be important for effective education and communication programs aiming to increase public concerns for biodiversity and its conservation, suggesting that they include a section detailing how biodiversity loss has certain consequences in the near future, for people and in areas that are close to the public targeted. Future research should deepen the understanding of the relationship between environmental expertise, personal experience, psychological distance, and conservation behaviours.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su142416490/s1. The instructions and questions used for both studies are presented in the Supplementary File attached to this article.

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