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A Grounded Theory of Pro-Nature Behaviour: From Moral Concern to Sustained Action

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Abstract: Worldwide ecosystem decline is a pressing issue that has led governments to sign up to biodiversity-related targets, but little is known about what drives individuals' conservation behaviour. This study uses a qualitative methodology (grounded theory) to understand what leads to pro-nature attitudes and behaviours. Twenty participants (10 men; 10 women) underwent semi-structured interviews and audio files were transcribed and coded to form the basis of theory. The authors propose a model based on interview material in which species with intrinsic value (i.e., deemed valuable in their own right, not for their usefulness to humans) are within the bounds of moral consideration. Individuals with generalised beliefs about the intrinsic value of non-human species expressed moral concern for human-caused impacts on nature. External prompts, including social messages, were associated with sporadic pro-nature behaviours. Individuals engaging in sustained behaviour showed evidence of having internalised moral standard of pro-nature actions and also appeared to fashion a social environment that would sustain and enhance their moral views. We discuss the implications of our findings with respect to conservation campaign messaging and government policy.

Keywords: pro-nature behaviour; pro-environmental behaviour; behaviour change; biodiversity; conservation; moral concern; intrinsic value; instrumental value; value-norm-belief theory

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1. Introduction

Human activity harms the ecosystem through diverse and intricate pathways. Much of the media focus has been dedicated to climate change and its impact on specific world events, whereas another human-caused existential threat—biodiversity loss—has received less coverage [1]. In 2020, the World Wildlife Fund (WWF) reported a 68% decrease, on average, in animal populations between 1970 and 2016 [2]. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) published a report detailing the various serious ramifications of biodiversity loss for human health [3]. For example, the report noted that healthy ecosystems are required for good air quality, food availability and access to natural medicines on which approximately 4 billion people rely. There are also socioeconomic implications, such as social conflicts that will likely intensify if food and water security are threatened [3].

Initiatives to conserve biodiversity are taking place at national and local levels. At the government level, Wales passed the Well-being of Future Generations Act in 2015 [4]. The Act requires public bodies to set goals for achieving a range of objectives, one of which is to maintain and enhance biodiverse environments and healthy ecosystems. Hundreds of other governments are signing up to the United Nations' Sustainable Development Goals, two of which explicitly relate to protecting biodiversity (on land and in the sea) [5]. Nilon et al. [6] examined city plans that had incorporated biodiversity-related targets, highlighting common features of plans from 40 cities internationally such as habitat conservation and

ecological connectivity (e.g., maintaining corridors for wildlife). Most city plans included community engagement, incorporating elements such as citizen science and education. These engagement efforts can help build a political mandate for environmental policy [7] and overcome political reluctance to implement conservation targets [8,9]. Furthermore, they can help engender behaviour change amongst consumers and citizens, for example, by purchasing sustainable products and supporting conservation policies. As Nielsen and colleagues [10] (p. 550) pointed out, "Because human activities are responsible for driving ecosystem decline, reversing current trends will require profound and persistent changes to human behaviour across actors and scales."

At the level of individual actors, very little is known about the factors that might facilitate or inhibit behaviour to conserve biodiversity. Richardson et al. [11] noted that most psychological research in this area has focused on behaviours affecting one's carbon footprint and the environment more generally (such as recycling and reducing waste) [12] as opposed to those specifically focused on the preservation of diverse species (such as undertaking voluntary conservation work or installing a bee hotel) [13]. Barbett, Stupple, Sweet, Schofield and Richardson [14] remarked that many researchers have made a distinction between general pro-environmental behaviours and species-preserving (pro-nature) behaviours. For example, Hughes, Richardson and Lumber [15] distinguished between general pro-environmental behaviours "around resource use and energy saving" (e.g., saving water and recycling) and "pro-nature behaviours" (p. 13) such as feeding garden birds and joining a nature group. Martin et al. [16] reported a factor analysis in which items on a pro-environmental behaviour questionnaire loaded onto two separate behavioural factors, one of which related more directly to nature conservation (e.g., donating money to an environmental/conservation organisation) whereas the other was more concerned with household behaviours (e.g., recycling). The two factors showed some similar patterns of associations with some variables, i.e., both were associated with watching/listening to nature documentaries and neither was related to living in a greener neighbourhood. For some other variables, there were differential associations; for example, visiting natural spaces moderated the association between nature conservation behaviours and nature connectedness, but nature visits did not moderate the association between household behaviours and nature connectedness. Richardson et al. [11] argued for the importance of understanding the determinants of pro-nature behaviour, in addition to pro-environmental behaviour more generally.

Environmental psychology has focused less on pro-nature behaviours compared to general pro-environmentalism, where well-known theories have been applied. For example, Yadav and Pathak [17] tested the applicability to pro-environmentalism of the theory of planned behaviour (TPB) [18]. The researchers found that key variables in the TPB accounted for participants' purchase of green products: the intention to do so, which in turn was predicted by attitude toward the behaviour; subjective norm; and perceived behavioural control. Another theory is that of bounded rationality, in which our capacity for rational behaviour is limited by habits, heuristics and emotions [19]. Elements of this theory have received support in the case of pro-environmental behaviour, such as the role of habits and negative emotion in the intention to reduce food waste [20] and the dominance of subjective versus objective costs of recycling as a predictor of recycling behaviour [21]. Theories have been applied across a variety of contexts, such as tourism; for example, Stern's [22] theory of environmentally significant behaviour has been found to account for pro-environmental behaviours among golfing tourists [23].

One notable theory of pro-nature behaviour comes from Clayton, Fraser and Burgess [24], who proposed that concern toward nature depends on the belief that non-human species can experience human-like emotions and cognitions (i.e., anthropomorphism) [25]. There is evidence that anthropomorphism of nature is associated with and can influence pro-environmentalism (for a review, see Williams, Whitmarsh, & Mac Giolla Chríost) [26], and some studies have found this association for pro-nature behaviour specifically (e.g., Tam) [27]. Another account of pro-nature behaviour is nature connectedness, in which the

degree to which people see themselves as part of nature influences the value placed on nature, as natural entities will be included in the cognitive representation of oneself [28]. Richardson et al. [11] showed connectedness to nature to be predictive of variance in pro-nature behaviour, while Hughes et al. [15] reported an association between children's connectedness to nature and the probability of carrying out pro-nature behaviours.

This research on pro-nature behaviour has applied a hypothetico-deductive approach, where the range of variables under consideration is constrained by pre-existing theory. While valuable, this purely top-down method risks ignoring a range of novel, and perhaps unexpected, influences on pro-nature behaviour. Qualitative methodologies can help address this limitation with a more exploratory approach where the research question is less narrowly specified (Charmaz) [29]. A limited number of studies have adopted this approach to address issues related to pro-nature behaviour. For example, one qualitative study examined the acceptance of conservation of dry meadows and mire landscapes in Switzerland among individuals who were directly impacted by such measures (such as farmers and landowners) [30]. Measures that were perceived to be beneficial to humans were more likely to be accepted, as were those with a clear economic purpose. A systematic review of qualitative studies on farmers in the United States [31] identified recurring themes to explain motivation to adopt conservation practices. Farmer characteristics was one theme, where having an identity as a steward or an innovator was associated with stronger nature conservation. The study also identified commonly cited barriers to conservation behaviour, such as perceived social norms and economic factors. However, few qualitative studies have explored the everyday pro-nature behaviours that individuals undertake outside of their professional lives. One such study is that of Caissie and Halpenny [32], who interviewed volunteers at a Canadian nature conservation programme, identifying both altruistic as well as less selfless motives for participating, such as pleasure-seeking.

The current paper presents a study whose aim was to bring new insights to a poorly understood area. Pro-nature behaviour is an emerging field of research and very little is known about what might explain its occurrence and its relation to other concepts. Studies to date have explored the association of pro-nature behaviours with a limited set of factors, but a wealth of variables remain to be examined, such as beliefs and attitudes. We present results from a qualitative approach (grounded theory) [33] and a new model that was generated to explain pro-nature behaviours. The broad question being asked in this research was: "What psychological factors are associated with pro-nature behaviours?"

2. Materials and Methods

2.1. Participants

Twenty volunteers were interviewed that met the basic requirements of being at least 18 years old and fluent English speakers. We began with a convenience sample of 11 undergraduate students recruited from a UK university. The students were all psychology undergraduates who received course credit for participation. Gifford and Nilsson [34] reported that most studies had found younger participants to have more environmental concern than older groups, thus it was reasoned that this group of participants would be most likely to evidence some of the pro-nature views and behaviours of interest in this study. Seven interviews took place in person and an additional four took place remotely due to COVID-19 restrictions. The students varied considerably as to whether they engaged in pro-nature behaviour and those who did identified the following: eating a diet perceived to minimise the suffering of non-human species, donating to conservation charities and trying to convince others to engage in pro-nature actions.

The second group consisted of pro-nature participants, who were recruited via social media (six participants) as part of theoretical sampling (Charmaz) [35], in order for the theory to better account for people who engage in regular pro-nature behaviour. This was achieved by advertising the study on social media groups centred around veganism, environmentalism and climate change activism. Interviews took place remotely. These participants identified a variety of everyday pro-nature actions: eating a diet perceived to

minimise the suffering of non-human species, donating to conservation charities, choosing to pursue a conservation education, taking a job in the field of conservation and carrying out conservation projects, as well as social actions such as trying to convince friends and family to engage in pro-nature behaviours and asking local shopkeepers to change their practices.

A third contrasting group was recruited (animal workers; three participants) to further develop the theory by considering how potential differences in attitudes toward non-human species and conservation could be influential. The study was advertised on social media groups for abattoir/meat workers, farmers and veterinarians. Their interviews took place remotely. There was one livestock veterinarian, one ex-farmer who provided environmental consultation to farmers and one abattoir worker. Only one participant in this group evidenced pro-nature behaviours, which consisted of adopting animals that needed a home and raising a type of animal that was at risk of extinction.

We aimed to sample a diverse range of ages and to obtain a sample balanced by gender. The age range of the sample was 18 to 59, (M = 28.25 years; SD = 12.63; see Table 1). Fifteen participants were based in the UK (where the study was conducted), and there was one participant based in each of the following countries: Australia, Belgium, Nigeria, Bangladesh and Nepal. Four of the international participants were in the pro-nature group and one was in the animal workers group.

Table 1. Mean age and gender makeup of each participant group.

Group	Mean Age (SD)	Gender Makeup
Undergraduates	20 (2.79)	7 women; 4 men
Pro-nature group	37 (12.26)	1 woman; 5 men
Animal workers	41 (15.87)	2 women; 1 man

2.2. Procedure

Participants read an information sheet and completed a consent form. The first seven participants completed a card-sort task (adapted from Doran, Böhm, & Hanss) [36]. Participants saw a row of cards, each one with the name of a non-human species, and were asked to re-arrange the cards in order of most to least similar to humans. This prompted a conversation about species and participants were then asked about the characteristics that they liked and disliked about different species, the empathy they felt for species and the species that they would choose to protect over others and how they would do this.

The card-sort task was discontinued following the seventh interview due to participants' responses to the task having reached a saturation point. Subsequent interviews instead covered the same topics by posing broad questions to elicit equivalent responses (see Table 2).

The first author transcribed and coded the interview material in parallel with ongoing data collection, to allow for subsequent interviews to be adapted in order to elaborate on key emerging concepts and address gaps. For example, the initial questions for interviews (Table 2) were adapted to include questions about feeling connected to nature, to ask about early life experiences with nature and to ask about the social context surrounding participants' pro-nature attitudes and behaviour.

Interviews were terminated after 20 participants as the emergent theory was deemed to adequately account for the range of constructs and their properties (i.e., theoretical saturation; Charmaz) [35]. This number is typical for grounded theory studies intended to generate new explanatory models [37].

Table 2. Initial interview questions.

Interview Questions
1. [Card-sort task] Why did you rate the species over here as most similar to humans?
2. [Card-sort task] Why did you rate the ones over here as least similar to humans?
3. Which species do you think are most similar to humans?
4. Which species do you think are least similar to humans?
5. Which species do you like the most?
6. Why do you like these species?
7. Which species do you like the least?
8. Why do you like these species less?
9. Which species do you feel most empathy for?
10. Why do you feel empathy for these species?
11. Which species do you feel least empathy for?
12. Why do you feel less empathy for these species?
13. If you knew that humans could destroy the habitat or environment of any of these species, which species would you most like to protect?
13.a. Why did you choose this species?
13.b. What lengths would you go to in order to protect this species?
14. Which species would you care least about protecting?
14.a. Why did you choose this species?
14.b. What lengths would you go to in order to protect this species?

2.3. Data Analysis

Grounded theory [33] is an inductive method that can be used to build an understanding of psychological or social processes. This methodology generates theory grounded in the close inspection of qualitative material; it seeks to understand "what is going on in the data" [38] (p. 94). Audio-recorded interviews were transcribed and the resulting transcripts were analysed using NVIVO [39]. Grounded theory unfolded via a set of operations for developing theory from transcribed interviews, which were then used as a flexible guide for ensuring that the emerging theory was grounded in the data. The first author carried out all of these stages and consulted with the co-authors at various stages (see below). The first stage was open coding, in which the first author identified a list of basic concepts in participants' interviews and created categories of codes. Axial coding followed, in which the relationships between categories were considered. Finally, selective coding involved the identification of a core category: a higher level of abstraction to which all other categories relate.

The grounded theory technique of line-by-line open coding was used for the purpose of maximising a bottom-up focus on describing participants' material without referring to theory at an early stage, and the constant comparison method was used throughout (Charmaz) [35]. The first author engaged in dialogue with the co-authors, who assisted with identifying codes to represent the material, contributed to the sampling strategy and, following theory development, suggested relevant theories and empirical work to compare/contrast with the present study's findings. In using memos and a reflective diary (Charmaz) [35], the first author attempted to bracket his own perspectives when building the theory. As an individual who strongly supports animal rights, he was aware that his own beliefs about the treatment of nature would likely influence theory development. One way of mitigating this was to remain curious about the emergence of concepts that were novel to him and not to ignore the many instances in which participants' responses contradicted what he might have expected.

3. Results and Theory

Two central themes and related concepts emerged as an explanation for pro-nature attitudes and behaviours: moral consideration (the extent to which particular species were perceived as worthy targets of moral behaviour) and moral concern (the extent to which participants objected to known harm caused to species by humans). All other key concepts interacted with these central concepts in the explanation of pro-nature attitudes and behaviour. First, our model identifies species factors that determine which species were considered worthy of moral consideration. Second, we describe individual factors associated with moral concern for humankind's impact on other species and pro-nature behaviour.

3.1. Species-Level Factors

Species differed in whether they were considered worthy of moral consideration. We adapted Singer's [40] concept of the "moral circle" to describe the set of species judged to be worthy of consideration. Two beliefs were found to substantially influence species' admission to the moral circle. Species with intrinsic value (i.e., deemed valuable in their own right and not merely for their usefulness to humans) were deemed worthy of moral consideration (see Figure 1). Species that were perceived purely in terms of their instrumental value (either the harm they cause to humans or the benefits they could bring to humans through their use) and had no perceived intrinsic value were not given moral consideration.

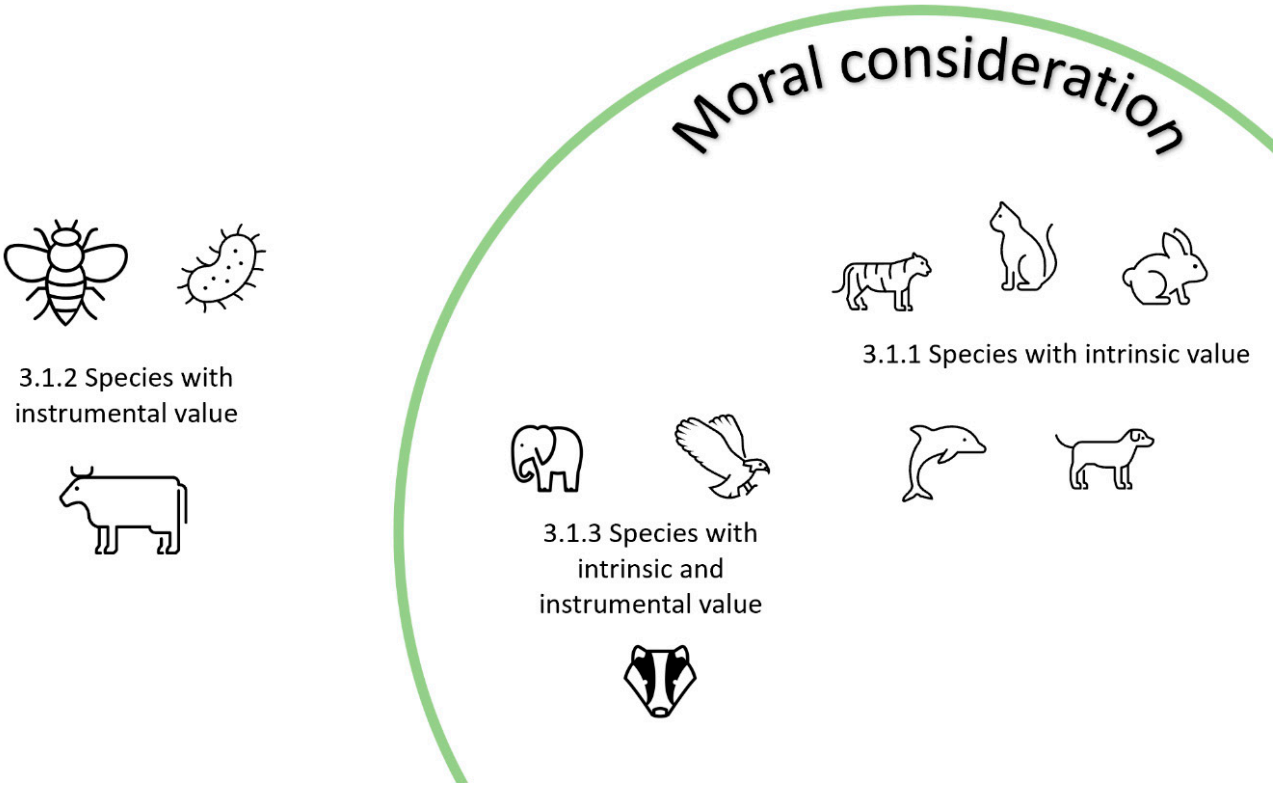

Figure 1. A depiction of the study's findings, showing the relation between species' intrinsic/instrumental value and moral consideration. Species in the diagram are those discussed by participants. Instrumental value can be negative (a species that is harmful to human interests) or positive (a species that can be used to benefit human interests). Numbers relate to corresponding sections in the narrative summary.

3.1.1. Intrinsic Value

Participants evoked intrinsic value (a species' "value aside from its usefulness to humans") [41] (p. 262) to explain their objection to causing harm to the species. Other justifications for moral consideration of species resonated with the wider literature on intrinsic value: species' "right to exist" [42] (p. 4), their right to be here and objecting to

humans' interference with the natural course of the species' evolution and causing their extinction [43].

> *"You know, why would you pay two thousand pounds for a dog when you could rescue one that's probably still young, got a load of life left in it, um we've got horses they're all rescue horses. Why not? We can . . . we can give those animals a better life. And I'd rather do that than spend thousands of pounds buying something that's just been bred to make people money."*
>
> *(Participant 20)*

Most participants, across all groups, described intrinsic value beliefs toward specific creatures, including pets but also wild animals such as tigers and chimpanzees.

3.1.2. Instrumental Value

Instrumental value, by contrast, was a basis on which participants justified a lack of moral consideration of a particular species (in the absence of intrinsic value). This entails a belief about species' usefulness to humans, which is the conceptual opposite of intrinsic value [44]. Perceiving species to be harmful to human interests was conceptualised as negative instrumental value, and perceiving species to have a beneficial use for humans was termed positive instrumental value. Species either perceived as negative or positive in terms of instrumental value—where there was no perceived intrinsic value—were not afforded moral consideration.

To start with an example of negative instrumental value, Participants 3 and 4 explained why they would be more protective of bees over wasps with both accounts making the distinction between wasps' deliberate harm to humans, as opposed to bees' relative harmlessness.

As for positive instrumental value, one participant, who worked in an abattoir, justified killing cows on the basis that they could be used for human benefit (food) and had no intrinsic value. He indicated the role of social context in shaping his views.

> *"Always seen cows as meat and milk. I've just always grown up with steak, mince, burgers, milk . . . "*
>
> *(Participant 17)*

This participant indicated that other species in general had intrinsic value and opposed the poaching of tigers and other species on the basis that they lacked instrumental value.

> *" . . . why do it, same with other animals, like bears . . . what other animals get used for their skins . . . pointless killings . . . we don't eat them . . . we don't do anything with their meat, we just take their skin . . . there's no point killing them . . . "*
>
> *(Participant 17)*

3.1.3. Intrinsic and Instrumental Value

Some species were described as having both intrinsic and instrumental value. These were deemed worthy of moral consideration and where harm toward them was deemed justified, it was to be done in a humane fashion. For example, the veterinarian considered badgers worthy of moral consideration and explained her support for culling (in order to prevent the spread of TB to cows) that would minimise their suffering.

> *" . . . and obviously it's only allowed to happen over a short period of time. So you don't traumatise badgers and their cubs and that sort of thing. So, yeah, it's one sentient animal versus another [cows], you know, it is a balance . . . "*
>
> *(Participant 16)*

Other species perceived to have both types of value included elephants, mink and predatory bird species, and there was a similar moral reasoning process that considered balancing the harms entailed in culling species versus the harm that would come to humans or other species through non-action.

A vegan participant, who described a general belief that all species have intrinsic value, explored his reasons for considering it justifiable to kill wasps.

> *"I guess I didn't like the way they'd been in my wasp trap killing some of my moths really . . . uhm . . . so it's almost like a punishment in a way, I suppose it's a punishment thing . . . which I don't really agree with capital punishment anyway . . . yeah I'm not gonna do it anymore . . . it was wrong . . . "*
>
> *(Participant 15)*

Here we can see the reasoning that brings wasps within the moral circle. The participant came to realise that his actions toward wasps based on their negative instrumental value were incongruous with his views about non-human species' intrinsic value.

3.2. Individual-Level Factors

The participants were categorised according to their degree of pro-nature behaviour. Some individuals expressed moral concern but engaged in no current pro-nature behaviour. Some described pro-nature behaviour that was sporadic. Finally, some individuals described sustained pro-nature behaviour. We conceptualised these groups as three different stages of pro-nature behavioural development (see Figure 2) and in the following sections describe the factors that appear to facilitate individuals to reach each stage.

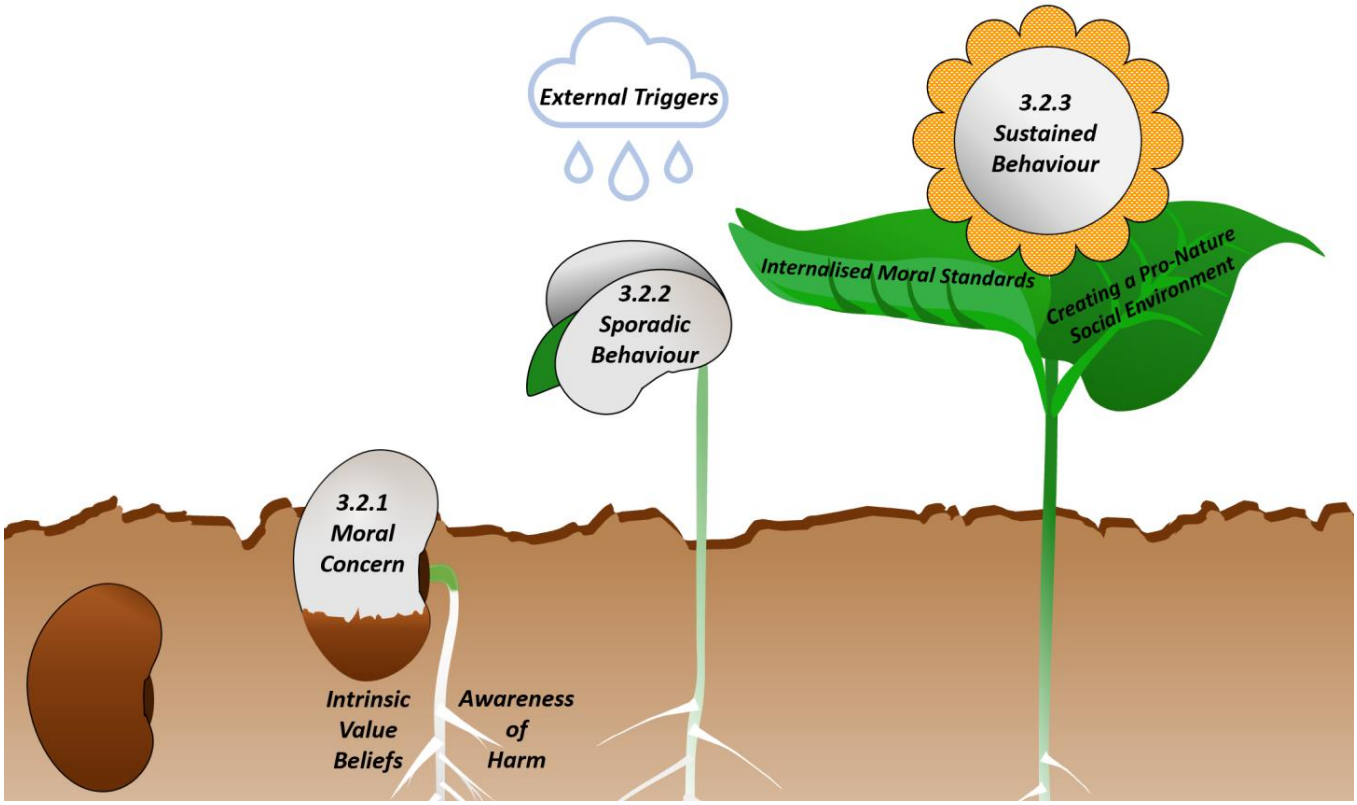

Figure 2. An illustration of individual-level variables that explain differences in moral concern and sporadic and sustained pro-nature behaviour. Numbers relate to corresponding sections in the narrative summary.

3.2.1. Moral Concern

Expressions of moral concern for the harmful actions of humans against non-human species came from everyone in the pro-nature group, four of the students and two of the animal workers. Moral concern appeared to arise out of two factors in combination: a general belief in the intrinsic value of non-human species and the awareness that humans are causing harm to these targets of intrinsic value.

Intrinsic Value Beliefs

We define general intrinsic value beliefs similarly to the above definition of intrinsic value as applied to individual species: the belief that all non-human animals or species have value aside from their usefulness to humans [41].

> *"This is our planet and we need to look after it . . . cos this is where we live this is our home this is everyone's home, and we're not the only ones living here, there's other animals, so we need to live together."*
>
> *(Participant 17)*

Exposure to species in childhood and having pets were sometimes referred to as sources of developing a generalised belief in species' intrinsic value.

> *" . . . you realise that they [pets], I suppose, have got a right to live and have a nice life, and you can kind of extend that to all animals, so you think why . . . you know why are pets special, like . . . "*
>
> *(Participant 15)*

Awareness of Harm

The awareness of harm to species in the context of intrinsic value beliefs was associated with moral concern for the harm caused by humans to non-human species. Seldom did participants spontaneously express concern about harm where humans were not obviously culpable. The participants described a permeable boundary between their own and others' morality, expressing anger, frustration, guilt and sometimes horror over humans' harmful behaviours toward other species.

> *"I personally think hunting is horrible, I wouldn't be friends with someone who is a hunter personally, it's not very nice it's disgusting, but these species need to be protected because they're part of the earth, they're not there to be hunted and killed."*
>
> *(Participant 13)*

> *"You just feel guilty, like we're not the only species on the planet. And to wipe out millions of other species is just selfish."*
>
> *(Participant 19)*

Some participants explained that the interconnectedness of nature is a motivator for moral concern and attitudes toward nature. We conceptualised this as contributing to the awareness of the harm that humans can and could cause other species through their actions.

> *"I'm not very spiritual, I do believe in the butterfly effect, I think there's a balance in nature that needs to be respected, that should be respected, in the sense that everything is connected, the water, the land . . . "*
>
> *(Participant 10)*

3.2.2. Sporadic Behaviour

Three participants (all students) described sporadic pro-nature behaviour. Their sporadic behaviours included making one-off donations to conservation charities, occasionally eating a diet perceived to minimise the suffering of non-human species (such as a vegan diet) or encountering a distressed animal in the real world and acting to alleviate its suffering. External triggers appeared to facilitate these sporadic actions.

External Triggers

Sporadic behaviours were triggered by external events, such as witnessing a suffering creature, watching a documentary and prompts to act from one's social circle.

> *"The people I live with at uni, a lot of them are vegetarians. And and they're always like telling me, like and like sending me to videos and things like that, and just sort of saying it would be really, really good if you did this."*
>
> *(Participant 18)*

The participants also expressed motivation to be perceived positively by one's social circle and not wanting to behave out of keeping with others' expectations.

> *" . . . like with environmentalists like Greta Thunberg, it's kind of cool to support her and be 'right on' . . . "*
>
> *(Participant 14)*

Externally triggered behaviours appeared to require ongoing prompts, as evidenced in the following quote.

> *"But then again, I don't know whether I'd be able to maintain those behaviours when I do come home."*
>
> *(Participant 18)*

3.2.3. Sustained Behaviour

Nine participants described sustained pro-nature behaviour (everyone in the pro-nature group, two students and one animal worker). The behaviours described included eating a diet perceived to minimise the suffering of non-human species (e.g., not drinking milk), donating consistently to conservation charities, choosing to pursue a conservation education, taking a job in the field of conservation, carrying out conservation projects, rescuing animals in need of a home and breeding species at risk of extinction. Some individuals described social actions to try and convince others to take up pro-nature behaviours, such as asking shopkeepers not to use plastic bags.

Two factors set these individuals apart from the others: internalised moral standards and creating a pro-nature social environment.

Internalised Moral Standards

All of those engaging in sustained pro-nature behaviour indicated that they had internalised a set of moral standards. Their behaviour was internally motivated as opposed to externally triggered behaviours. These participants described a sense of obligation or responsibility to act.

> *" . . . so that is more than a governmental responsibility, it is a personal responsibility as well."*
>
> *(Participant 11)*

> *"I'm trying to do my best to make differences in my own life to kind of reduce the effect I have."*
>
> *(Participant 14)*

Conversely, a lack of personal responsibility for addressing the harm caused by humans was a consistent theme across participants who did not engage in any pro-nature behaviour. These participants either expressed confusion about who should act or argued that only governments or big corporations could and needed to act, and saw no role for themselves.

> *" . . . it's more up to the government of the countries to stop hunting them . . . "*
>
> *(Participant 17)*

Some of the participants engaging in sustained pro-nature behaviour described it as a means of elevating self-esteem or would experience guilt on a regular basis over aspects of their life that were not perceived to be nature-friendly. This is consistent with an internalised personal standard for self-evaluation. When asked what would happen to her behaviour if she were to move away from her pro-nature friends, one participant replied.

> *"Um I'd like to think it'd probably stay the same . . . because it is always . . . it is kind of a self-esteem boost to think that you are making change as well [. . .] you can't really forget it once you've done all the research and all of that . . . I think the guilt would be there . . . "*
>
> *(Participant 14)*

Another participant explained his reasons for not consuming animal products.

> *"It's an industry and uh these animals are made to give more and more and more milk and they're killed for beef, so it feels really bad, you know there's an instance in fact my you know when you have a cup of coffee or when you're having some milk to drink, you used to say you know you are drinking a cup of sin . . . "*
>
> *(Participant 11)*

Creating a Pro-Nature Social Environment

Most of the participants who engaged in self-motivated pro-nature behaviours described creating a social environment comprising individuals with similar views. This was achieved in a variety of ways, including seeking out social groups, friends and partners with pro-nature views or by arguing in favour of pro-nature attitudes and behaviours with their existing circle of family and friends. Three of these participants were in the pro-nature group, one was a student and one was an animal worker. These social connections often led to obtaining more information about how to behave in a pro-nature fashion.

> *"[Joining social media groups is] a way to meet people, I thought, meet likeminded people . . . that was my main motivation . . . for actually joining to be honest, I mean now it's not that at all, it's just useful as they tell you what products are available, what new products are out, where you get cheap vegan stuff on offer and stuff like that . . . "*
>
> *(Participant 15)*

Hence, while the social milieu might be an external prompt for pro-nature behaviour for some, those who have internalised a moral standard of pro-nature identity may deliberately curate pro-nature social surroundings that align with and reinforce their own values and behaviours.

4. Discussion and Conclusions

4.1. Summary and Discussion

The present study found many factors to be associated with the variation in participants' pro-nature behaviour. The species assigned intrinsic value (i.e., valued in their own right and not only for what they can do for humans) appeared to be granted moral consideration. While instrumental value is often described as valuing a species for what it can do for humans, we used the concept more broadly to capture the fact that participants could either perceive a species as being detrimental to human interests or as being useful in some way to further human interests. This is similar to Serpell's [45] concept of positive and negative utility. Species perceived in terms of either positive or negative instrumental value (in the absence of intrinsic value) were not granted moral consideration.

We adapted Singer's [40] concept of the "moral circle" to illustrate the boundary between species that were granted moral consideration and those that were not. The contribution of our study is that intrinsic value (with or without instrumental value) appears to grant species access to the moral circle, as this was the reasoning that participants used when explaining their moral consideration for some species and not others. There was one instance in which the expansion of moral consideration from humans to non-human species happened 'live': the participant who invoked his objection to a human law (capital punishment) as justification for his decision no longer to kill a particular species (wasps). This example resonates with work by Stone and colleagues on hypocrisy induction (summarised in Stone & Fernandez) [46], in which it has been shown that highlighting the inconsistency between a person's attitudes and their behaviour can lead to behaviour

change. This research was motivated by, and supports, cognitive dissonance theory, where the disparity between attitudes and behaviours causes psychological discomfort which motivates an attempt to resolve the disparity through various means, including behaviour change [47].

At the individual level, generalised beliefs about the intrinsic value of non-human species coupled with the awareness of harm caused to species by humans appeared to distinguish those who expressed moral concern over the harm caused to species by humans from those who did not. Whereas external prompts appeared to account for sporadic pro-nature behaviour in some, those who engaged in sustained pro-nature behaviour described an internalised morality with respect to nature. This is consistent with research on motivation which distinguishes extrinsic and intrinsic motivation, the former driven by external factors such as rewards and the latter by internal factors such as values [48]. Another feature of this last group was that they sought to create a social environment of like-minded others.

The empirical literature on pro-nature behaviour supports many of the findings in our study. The association between nature connectedness and pro-nature behaviour has been shown in one study to be mediated by concern for non-human species, as opposed to concern for human welfare [49], consistent with the importance of moral concern in our model. Previous research has shown that pet ownership is associated with concern for species preservation and less support for strategies that put human needs above those of wildlife [50]. Adolescents who provide more care for their family dog have been found to engage in more pro-environmental behaviours [51]. Chawla [52] also summarised research findings in which concern for non-human species is enhanced by exposure to and exploration of nature in childhood. Our model offers a possible pathway for these influences: interaction with species, including pets, may facilitate the development of a general belief in the intrinsic value of non-human species.

The model we have presented in the current paper could be seen as an extension to the value-belief-norm theory (VBN) of Stern, Dietz, Abel, Guagnano and Kalof [53]. The VBN theory posits that values (such as altruism) lead to a belief that (i) there are broad consequences of environmental decline for valued targets (such as other humans), and (ii) one is responsible for contributing to/alleviating these consequences. These beliefs lead to a personal moral norm in which there is a sense of obligation to engage in a variety of pro-environmental behaviours. We could consider the internalised moral standard in the model that we have advanced as conceptually similar to the personal moral norm in the VBN theory. Although the VBN theory focuses on a variety of different values as underpinning important beliefs, it might be that those with generalised beliefs about the intrinsic value of non-human species are those who value the biosphere (i.e., biospheric values; De Groot and Steg) [54].

Another extension to the VBN theory provided by our model is that people who have formed personal standards of pro-nature behaviour act to bring their social environment in line with their personal beliefs, which leads to more sustained pro-nature behaviour. There are at least two mechanisms by which this might lead to sustained pro-nature behaviour. First, immersing oneself in a particular group would bring one into contact with a new set of social norms. It has been shown that social norms can be internalised as personal norms; for example, a meta-analysis by Klöckner [55] showed that personal norms mediate the influence of social norms on pro-environmental behavioural intention. Second, pro-nature identity might also play a role. While participants did not spontaneously refer to identity, surrounding oneself with like-minded others implies holding a particular view of oneself and seeking contact with the in-group (cf. Tajfel, Turner, Austin, and Worchel's social identity theory) [56], and continued contact with a particular group may come to strengthen one's sense of identity (e.g., as an animal lover). Stern et al. [53] made a distinction between the predictors of support for pro-environmentalism included in the VBN theory and "identity transformation" which may predict "committed activist participation" (p. 86). These authors noted that a pro-environmentalist identity may be

an important variable not measured in their survey validation of the VBN theory and our findings indicate that this may be an important factor in sustained pro-nature behaviour.

The VBN theory does not distinguish between sporadic and sustained behaviour, whereas our model proposed that sporadic pro-nature behaviour can be triggered by external prompts, such as social messages. The role of triggers in the present study's model is similar to the subjective norm in the theory of planned behaviour [18], where the intention to perform a behaviour is shaped by perceptions of how one would be judged by important others for (not) performing the behaviour. The concept of identity may also explain the difference between our externally and internally motivated participants. Zunick, Teeny and Fazio [57] advanced the concept of the "self-defining attitude," which functions to help people to define their identity and to communicate their identity to others. These researchers found that individuals were more likely to advocate publicly for a self-defining attitude than an attitude that did not serve a self-defining function. In fact, the internalised moral standards we proposed in our model could be reflective of self-defining attitudes, whereas externally triggered behaviours might rely on attitudes about those behaviours that have a social-adjustment function, i.e., those that support ongoing membership in a desired social group [58]. Further work applying attitude functions in this area would help to clarify this. It would be interesting to investigate the influence of attitude functions on the success of hypocrisy inductions [46], as we might expect that individuals would be more motivated to resolve discrepancies between behaviours and self-defining attitudes, as opposed to other kinds of attitudes.

We make a more specific statement than the VBN theory [53] about moral concern in that it appears to arise primarily from the knowledge that species are being harmed by humans, and not for other reasons. The frequent moral concern over human behaviour can be understood again with reference to social identity theory [56], in which humans are motivated to evaluate their own social group in a positive light as self-evaluation depends, in part, on social identity. Others' perceived immorality with respect to nature might threaten a positive sense of self. Our model also included a pathway from individuals' past experiences with species, such as pets, and developing beliefs about the value of species.

It is notable that, while discussions about species' similarity to humans (cf. anthropomorphism) were used as a starting point for questions in the first interviews, it did not emerge as an account of pro-nature behaviour in our model. It may be, however, that anthropomorphism intersects with some of the constructs advanced in our model. Seeing species as similar to humans may lead us to attribute to species the intrinsic value that we attribute to humans. Indeed, moral consideration, which we propose rests on intrinsic value beliefs, has been shown to be predicted by the belief that animals have a mind [59], which is a kind of anthropomorphism. Quantitative investigations would be helpful in order to clarify the association between these concepts and how, together, they might predict pro-nature behaviour.

4.2. Implications of the Findings

We regard the theory advanced in this paper as one plausible account of the interview material but acknowledge there may be others. As such, our theory is provisional and subject to empirical quantitative tests of this framework. In the meantime, the theory could be a helpful heuristic for conservation messaging tailored to individuals. For example, people who already believe in species' intrinsic value but who are yet to engage in pro-nature behaviour may be more persuaded by messaging focused on building awareness of harm caused to species by humans. For others, beliefs in species' intrinsic value may be more important to establish before introducing other messages. Chapman, Lickel and Markowitz [60] advocate for more research to test the power of tailoring messages to people's affective responses to environmental decline, highlighting anger as an emotion that motivates individuals to redress social injustice [61]. The participants in the current study expressed anger, among other emotions, when discussing the impact of humans on other species, but more research is needed to clarify the role of emotion in motivating pro-

nature behaviours. As previously discussed, the attitudes held by participants may have a variety of functions and tailoring on this basis may also be a fruitful avenue to explore; it is known that matching the content of persuasive messaging to the functional basis of an individual's attitude leads to greater persuasion (when the message is strong) [62].

Conservation campaigns often use a 'flagship' species to attract funding and rally support for a cause [63]. Our theory would suggest that those species deemed valuable in their own right and not just as a means to an end for humans may be particularly suited to a 'flagship' role. To the best of our knowledge, the role of beliefs about intrinsic value in predicting support for conservation campaigns has not been empirically tested, which would be a valuable contribution to the literature. Sarkar [64] argued that attributions of intrinsic value "are problematic in conservation biology because they would prevent necessary practices such as the culling of overgrown populations or invasive species" (p. 629). This argument is not supported by our findings, for two reasons. For one, some species (e.g., mink) were attributed both intrinsic and instrumental value by the same participants. This mirrors the finding that ecological values comprise two higher-order orthogonal dimensions, at least in Western populations (preservation and utilisation) [65]. Secondly, the participants described beliefs in species' intrinsic value whilst also supporting measures to cull species in a process of utilitarian reasoning about the balance of harm associated with various options.

There is a broader debate within conservation biology as to the merits of appealing to people's sense of what nature can do for them (instrumental value) versus valuing nature for its own sake (intrinsic value; Kareiva) [66]. From a position of pragmatism, regardless of the reasons that conservation programmes wish to protect species, our results suggest that encouraging beliefs about the intrinsic value of non-human species could mobilise individuals to assist with these goals. Kareiva [66] argued that appreciating what species can do for us could at times be helpful for conservation efforts; while this may be true in cases where species can benefit humans without being exploited, our study highlighted the importance of further specifying instrumental value to include how species can be beneficial, i.e., whether this would require some kind of exploitation. While it is intuitive that perceiving species as harmful to our interests would not encourage moral consideration, we also found that animals perceived to be beneficial to humans through their exploitation (in the absence of intrinsic value) was associated with a lack of moral consideration (e.g., when justifying the killing of animals for meat).

Our paper confirms previous findings in the literature regarding the benefits of exposure to species (including pets), particularly in childhood [50], for developing pro-nature behaviours. We propose that it is the development of intrinsic value beliefs about nature that can partly account for these benefits. Government policies aiming to address biodiversity loss might consider ways to provide more opportunities for young people to engage with non-human species, including access to green and blue spaces, coupled with the introduction of the concept of intrinsic value into education.

4.3. Limitations

The participants reported pro-nature actions spontaneously and there was no checklist of behaviours. It is likely that the participants did not identify all pro-nature behaviours; for example, no participant mentioned voting for pro-nature parties. Follow-up investigations would be useful to consider the range of pro-nature behaviours that may exist. The participants did not always find it easy to separate motivations underlying pro-nature actions as opposed to pro-environmental behaviours more generally. Further work is needed to establish whether these behaviours have different motivational bases.

Conducting interviews remotely allowed for the inclusion of participants from different nations, which tested the applicability of the model to diverse cultures. However, understanding the differences between cultures was beyond the scope of the study. There is evidence of cultural differences in ecological values; for example, in a Nepalese sample, Regmi, Johnson and Dahal [67] replicated the original finding that preservation and

utilisation are separable aspects of environmental values [65], but not that they are orthogonal. While we attempted to create a generalisable theory, arguably none of the segments recruited for our study represented a general population sample. There were difficulties recruiting individuals for the animal workers group, and responses on social media suggested negative emotional responses to the study; those who did opt to take part may not therefore have been representative of this segment and this may have influenced the developing theory. Many media reports focus on the role of livestock farming in climate change (e.g., "EU's Farm Animals 'Produce More Emissions Than Cars and Vans Combined") [68], and the intergovernmental panel on climate change has advised on the benefits of limiting meat consumption (IPCC) [69]. This political context may make certain groups suspicious of research with an environmental focus that asks for their views. The groups also differed in their age and gender distribution, with the undergraduates being markedly younger than the other two groups and the pro-nature group comprising mainly men, whereas the other two groups had a more balanced gender composition. Gender and age are known to be associated with pro-environmentalism [34] and might therefore have influenced the content that arose in interviews with the different participant groups. Age, for example, might explain why social influence from others was predominantly discussed in the undergraduate group, given the rise of youth-focused environmental movements such as "School Strike for Climate" [70]. The context of living with other students might also enhance the need to conform with one's peer group.

We attempted to lessen the bias associated with conducting some interviews remotely and others in person, as well as any other changes that the COVID-19 pandemic might have introduced, but these factors might have had an impact on participants' responses. It is possible that the card-sort task primed participants to think about the topic and to answer the questions in a certain way. The card-sort task centred around species' similarity to humans and this did not emerge as a concept in our theory, so there was no obvious influence. However, removing the card-sort task from the interviews after the first seven participants may have given rise to differences in participants' responses to the questions.

4.4. Conclusions

In this paper we have presented a new model to explain moral concern for non-human species and pro-nature behaviour, both sporadic and sustained. Our model shares similarities with previous empirical findings and theories, but provides useful extensions to our understanding of this field. We conclude that intrinsic value beliefs about non-human species are an important component of concern for nature. Our paper contributes to the ongoing debate about the relative value of intrinsic and instrumental value beliefs for promoting individuals' conservation behaviour and provides some nuance as to when these beliefs might help or hinder conservation efforts. Sporadic behaviour can result from external prompts to act, while sustained behaviour is associated with internalised moral standards and the creation of a pro-nature social environment. Further work would be beneficial to test the model using quantitative methodologies.

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