1997

Scope of Justice, Delegitimisation, Sentience and Ecosystemic Integrity as Predictors of Protection

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Scope of Justice, Delegitimisation, Sentience and Ecosystemic Integrity as Predictors of Protection

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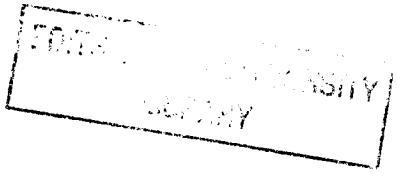
A Thesis Submitted in Partial Fulfillment of the

Requirements for the Award of

Bachelor of Arts (Psychology) Honours

Faculty of Health and Human Sciences, Edith Cowan University.



Date of Submission: 31. 10. 1997

Abstract

It is argued that the continuing environmental destruction results from an instrumental valuation of the non-human world. Fox's (1995) alternative intrinsic value approach to environmental protection is introduced. Two aspects of Fox's descriptive model may represent fundamental motives, or ethical bases, for behaviour. They are sentience -the quality of being capable of experiencing pain, and ecosystemic-integrity -the quality of contributing to the self-regenerating capacity of an ecosystem. The inconsistency between the presumed ethical bases for behaviour, and actual behaviour is noted. It is suggested that delegitimisation- the discounting of some desirable quality in a competitor during conflict, and the scope of justice- the flexible boundary within which moral rules apply, serve to mediate the effect of the presumed intrinsic value ethical bases on human behaviour towards non-humans. Participants were 637 (385 female, 282 male) university student volunteers of mixed cultural background aged 18 to 31. ANOVA revealed significant main effects, and no interactions, for sentience, integrity, or conflict on allocation of a wetland to a fictitious entity (Dodder). Effect sizes were small. ANOVA revealed no significant main effects or interactions for sentience, integrity or conflict, on the scope of justice. ANCOVA indicated that the small covariate effects of scope of justice (Cronbachs alpha = .84) for allocate ($\underline{r}$ = .155) were not sufficient to establish scope of justice as a mediator between sentience, conflict, or ecosystemic-integrity, and allocation. Delegitimisation of the Dodder's ability to feel pain (an aspect of sentience), and human need occurred. Delegitimisation of the Dodder's intelligence (an aspect of sentience) and ecosystemic integrity was not found. Wetland allocation to the Dodder occurred for reasons of life, endangerment, and protection, and allocation to humans was for reasons of

human need and importance. The presumed intrinsically valuable qualities of sentience and ecosystemic integrity do not seem to be powerful motives for behaviour towards the non-human world and as predictors of protection their practical relevance appears doubtful. Revision of the scope of justice scale, and attention to issues of endangerment versus conflict is recommended.

Declaration

I certify that this thesis does not incorporate without acknowledgement, any material previously submitted for a degree or diploma in any institution of higher education; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Signature [redacted]

Date 31/10/97

Acknowledgements

For their assistance with this work, I would like to thank;

the students of Edith Cowan University who took part in the research;

my fellow students for their friendship and support;

the staff of Edith Cowan University who made easy the participation of students;

Warwick Fox whose generosity of ideas provided the spark for this research,

Carol Gamesby for her secretarial support; and

Adelle Hills for her supervision.

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Scope of Justice, Delegitimisation, Sentience and Ecosystemic Integrity as Predictors of Protection

Planet earth is currently in a state of ecological crisis. Each second one acre of forest is destroyed (Pickering & Owen, 1994). Each year 50, 000 plant and animal species are destroyed and currently, one quarter of the world's mammals are threatened with extinction (Flavin, 1997). The extinction of plants and animals has occurred naturally throughout the earths history (Jablonski, 1986). However, the current extinctions are attributed to human behaviour (Flavin, 1997).

The clearing of forests, the loss of topsoil, the pollution of the air, rivers and the oceans and, the extinction of species are parts of what is loosely characterised as the environmental problem. The so-called "environmental problem" is more properly characterised however, as a problem of human behaviour (Cone & Hayes, 1984; Polunin, 1997). As the science of human behaviour, one might expect psychology to contribute to an understanding of so-called environmental problems, and to their solution (Reser, 1995).

According to Kidner (1994) however, psychology has contributed little to the understanding, or to the solution of so-called environmental problems. Kidner (1994) and Reser (1995) claimed that psychology's inability to contribute to the environmental debate is due to its own implicit endorsement of the structures or world-views that allow and promote environmental destruction. In particular, they refer to the anthropocentric world-view.

The anthropocentric world-view, or anthropocentrism, places humans at the centre of value in their relationship with the non-human world (Niebuhr, 1970). For

instance, when a fish species becomes threatened with extinction, a central concern may relate to how this would affect the lives of humans, since humans would then have to find other fish to eat. By contrast, a non-anthropocentric concern would focus on the possible extinction of the fish species. The anthropocentric world-view that is endorsed by psychology (Hargrove, 1992; Kidner, 1994; Reser, 1995) therefore results in the valuation of non-human entities[1] in terms of their instrumental value to humans (Costanza et al., 1997; Dore, 1996; Hayden, 1993; cf. International Union for the Conservation of Natural Resources, 1991; Lockwood, 1996).

Arguments for conservation are typically expressed in terms of human needs. For example, conservation is defined by the International Union for the Conservation of Natural Resources (1991) as, "the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations (of humans)"(item 1.4).

In order to clarify some of these instrumental arguments for protection Fox (1995) describes several categories of argument. These arguments include the life support system, gymnasium, recreation area cathedral, early warning system, museum, or pharmacy arguments. For example, the life support system argument is demonstrated by human concern that deforestation will lead to poorer air and water quality that may result in a reduced capacity of the earth to sustain human life. Thus the concern is for the human life support system, rather than the forest per-se. Similarly, the protection of a rainforest because it may contain a yet to be discovered medicine represents the

[1] The expression "entity", especially non-human entity, can conjure amazing images. However throughout this paper the term entity will be used to refer in a unitary sense, to an individual animal or plant, to the collective group of animals or plants, to the species or other collective whole of plants or animals such as an ecosystem.

pharmacy argument and again reflects a concern not for the forest per-se, but for humans. In each case, the argument for protection of non-human entities is the instrumental value or benefit that their protection may bring to humans.

Each of the values that Fox (1995) describes (for example, life support system, or laboratory) are commonly used as arguments for environmental protection (cf. International Union for the Conservation of Natural Resources 1991: cf. Department of Conservation and Land Management, 1997). Clearly however, the centre of value (Niebuhr, 1970) in each of these arguments is not the environmental entity per-se. Rather, the value arises mostly from the potential instrumental benefit that the entity may have for humans (Pimm, 1997, Waring, 1988). In these situations the entity only has value to the extent that it is valuable to humans. Therefore, it can be argued that each of these protection arguments reflects an anthropocentric ethical base.

A number of researchers contend that to argue for the protection of an entity on the basis of its instrumental value is to further endorse the instrumental valuation of the non-human world. They conclude that when the instrumental view is validated in this way, then other instrumental uses, perhaps even less protective, also appear valid. As Opotow (1994) states, "Viewing an environmental entity as an economic commodity rather than having intrinsic worth might be effective in the short run, but may have long-term negative consequences on its protection (p. 61)". Because the pharmacy, and life support system and other similar arguments endorse the instrumental value approach, they themselves can be seen as a part of the environmental problem (Collins & Barkdull, 1995; Hargrove, 1992; Kidner, 1994; Reser, 1995).

If society accepts the instrumental value ethic, then it is clear that a non-human entity will only be protected if there is some instrumental reason for humans to protect it. According to Seligman (1989), if society adopts the utilitarian ethic (an ethic that defines "rightness" according to the consequences of ones actions for other morally considerable beings (Bentham, 1988)[2]), then the outcome of human behaviour for non-humans is ethically irrelevant, until its consequences begin to affect the well-being of humans. Indeed, following the utilitarian ethic, the instrumental use of any entity that is not morally considerable, is not just, "not a bad thing" but is actually, a "very good thing" because the consequences for the humans ,who are deserving of moral consideration, are good (Goldman, 1995; Partridge, 1996). Thus the potential for a non-human entity to satisfy a human need is a necessary condition for the protection of the non-human entity (Seligman, 1989). For example, the Barrier Reef may be protected for the recreation opportunities it provides for humans, while reefs elsewhere that are less inaccessible for human recreation may be destroyed. The evidence of continued environmental destruction (Heywood, 1995) would suggest that approaches to environmental protection that rely on instrumental valuation of the non-human world are unsuccessful.

A belief held by many people in the environmental protection movement is that the non-human world is of value for itself and deserves protection for this reason alone (Cagnon-Thompson, & Barton, 1994; Merchant, 1990). Katz (1992) and Nash (1989) say that this perspective on the value of non-human entities is popularly referred to as the intrinsic value perspective

[2] "By the principle of utility is meant that principle which approves or disapproves of every action whatsoever according to the tendency which it appears to have to augment or diminish the happiness of the

The concept of intrinsic value

The concept of intrinsic value is difficult to define. Seligman (1989) has claimed that the concept is an anomaly and this view has been supported by Callicott who asserted that, "the central and most recalcitrant problem for environmental ethics is the problem of constructing an adequate theory of intrinsic value for non-human entities, and for nature as a whole" (1985 p. 257). The environmental philosophy literature that has dealt with the concept of intrinsic value, contains a confusion of definitions for the meaning of intrinsic value (O'Neil, 1997). It is unclear, and certainly not universally agreed upon, what, or if any, characteristics, attributes or states of being are intrinsically valuable (Seligman, 1989).

O'Neill's (1992) review of intrinsic value describes three basic senses to the term intrinsic value, and these senses yield several possible definitions. One sense of the term intrinsic value, is as a synonym for non-instrumental value. According to this sense, an entity is intrinsically valuable if its value arises from the status of the entity as an end in itself, and not from its status as a means to an end (O'Neill, 1992). In this sense a tree may be intrinsically valuable not because of the timber it provides, but for some other (supposedly) non-instrumental reason. In this end in itself sense it is possible that an entity can be intrinsically valuable, and instrumentally valuable, since it is unlikely that an entity is wholly a means, or wholly an end (Weston, 1992). However, Regan's (1992) contention is that intrinsic value is a categorical construct whereby intrinsic value is either possessed wholly, or is not possessed at all. By contrast, Warren (1983) proposes that intrinsic value exists on a continuum. Similarly, Callicott's (1984) position is that

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party whose interests are in question" (Bentham, 1988, chapter 1. ll).

an adequate value theory should provide for differential intrinsic value for different organisms and species and should further provide for the hierarchy of superorganismic entities such as species and ecosystems.

An alternative conception of intrinsic value is offered by Niebuhr (1970), and represents O'Neill's (1992) second sense of the term. Niebuhr (1970) focuses explicitly on context to determine value. He argues that value can only exist in the context of relationship and has no existence apart from relationship. In this sense value cannot exist if there is no valuer, and value becomes a function of an entities relationship with another entity. Niebuhr would therefore argue that genetic diversity is intrinsically valuable, and that environmental entities become intrinsically valuable by virtue of their place within ecosystems.

A third sense of the term intrinsic value is as a synonym for objective value. In this sense, intrinsic value is the value that an entity has in the absence of valuers or independently of the valuations of valuers (O'Neill, 1992). According to Rolston (1988), some values are objectively present, to be discovered, rather than generated, by the valuer. In this sense intrinsic value is not about the state of mind, or state of being, of an observer, instead it is about what is in an objective sense. That is, intrinsic value is about the state of affairs. This conception of intrinsic value is an objective value approach in which the entity is seen as having value independent of the subjective attitudes or preferences of other conscious beings (O'Neil, 1997).

Thus, from the theoretical perspective, there is considerable confusion about what it means to have intrinsic value (Hills, 1994). According to Bragg (1996), much of this confusion is a result of anthropocentrism and "either / or" distinctions that are apparent in

the foregoing discussion. She therefore endorses a more phenomenological approach to intrinsic value. The phenomenological approach is concerned with that which can be known directly via the senses, rather than that which can be known via rationalism or deduction.

One such approach is the deep ecological approach. According to Hills (1994);

> the ecological perspective focuses on the interconnectedness of the natural environment, and the fact that the integrity of the whole system depends on the "healthy" functioning of all its parts, irrespective of whether those parts are considered by humans to have instrumental or even inherent value (p. 36).

Therefore, deep ecologys' approach to intrinsic value is primarily concerned with biocentric (life centred) or ecocentric (ecosystem centred) attributes rather than anthropocentric attributes (Bragg, 1996). To use Niebuhr's expression, the centre of value implicit in the deep ecological approach is the ecosphere, or ecosystem rather than humanity or the individual human.

Fox (1995) used the ecocentric approach to value to create a descriptive model of the value bases that appear to exist in the human relationship with the non-human world. His model is phenomenological rather than axiological. That is, Fox's purpose is to describe what is out there that can be observed via the senses, rather than to develop a theory or set of rules that define value itself.

In his descriptive model of the ethical bases to behaviour, Fox (1995) distinguishes between an anthropocentric or instrumental ethical basis for behaviour, and a non-anthropocentric or intrinsic value ethical base. Of interest here is the so-called intrinsic value ethical base.

Fox's Model

Fox's phenomenological conception of intrinsic value includes the states of being, relational, and hierarchical aspects that can be observed in the previously discussed theoretical approaches to intrinsic value. Fox's model is a state-of-being model in that life and sentience, as inherent states of being, are included as a basis for intrinsic value. Fox's model is relational in the sense that the ecosystem is considered intrinsically valuable by virtue of its systemic or relational nature. Fox's model is hierarchical in the sense that each of the state-of-being and relational-value approaches is successively more inclusive. Thus, Fox's model includes many of the elements that are central to the theoretical debate.

The approaches to value that Fox (1995) uses are labelled by the attributes, qualities, or states of being that may form the basis of an ethic that has intrinsic value as its foundation. The four approaches are; awareness-based ethics, biological ethics (life-based ethics), ecosystem ethics, and cosmic purpose ethics (Fox, 1995).

For the present study, two approaches are of interest. They are awareness-based ethics, and ecosystem-ethics. An awareness-based ethic holds that sentient entities should get, or are deserving of, moral consideration because they are sentient. Thus, an awareness-based ethic represents a state-of-being valuation. An ecosystem ethic represents a relational value approach to valuation. An ecosystem-ethic presumes that entities get, or are deserving of, moral consideration because of their value in an ecological or ecosystemic sense.

Awareness Based Ethics (ethical sentientism)

Sentience – a definitional issue

In the pure physiological sense sentience means responsive to sensory stimuli (Burchfield, 1989). For example, a bacterium may move towards the light in response to sensory stimulation by the light. In the physiological sense the bacterium would be considered sentient. In a second sense sentience may mean conscious or percepient of something (Burchfield, 1989). Therefore the bacterium may move toward the light and be sentient in the first sense of the word, but not be conscious of the light and it would therefore be considered insentient in the second sense of the word. This second sense of the word is generally implied in the literature that relates to sentience and will be used in this paper. Its use in this second sense is intended to indicate that the capacity for sentience gives meaning to sensory experience. For instance, the Royal Society for the Prevention of Cruelty to Animals (RSPCA) (1980) implicitly endorses the mental experience aspects of sentience by reporting that fish are capable of experiencing pain, and suffering. Therefore, while sentience at one level is about the objective capacity for receiving sensation, the level of interest for this paper is the presumed subjective aspects associated with the objective stimuli.

The theoretical argument for a sentience based ethic

Advocates of an awareness-based ethic propose that the basis of moral consideration is sentience. The argument is that sentient life deserves moral consideration because what happens to it matters to itself. According to Taylor (1996), "A sentient being has intrinsic value in that it experiences what happens to it as good or bad for itself,

and this valuing of its own experience is independent of its utility for others" (p. 251). Because a sentient entity has interests it becomes important to itself how it is treated. To the sentient entity, it matters whether it experiences pleasure or pain (Singer, 1975). Because sentience allows an entity to have interests, sentience becomes the characteristic that defines whether an entity is deserving of moral consideration (O'Neil, 1997). Thus there is a sound rational argument in support of sentience as a possible ethical basis for human behaviour towards non-human entities. There is also much practical evidence, that will be presented now, to support the idea that sentience is a basis for moral consideration.

The applied argument for a sentience based ethic

The moral relevance of the experience of pain is recognised at the international level. For instance, Article seven of The International Covenant on Civil and Political Rights states that, "No one (human) shall be subjected to torture or to cruel...treatment" (United Nations, 1978 p. 24). While Article seven relates implicitly to human pain, its objective focus is on the experience of pain per-se. A further indication of the ethical unacceptability of inflicting avoidable pain is the use of anaesthetic drugs during surgery (Abrahams & Buckner, 1983).

The social unacceptability of the infliction of pain on other sentient beings is identified as socially inappropriate behaviour by its inclusion in the Diagnostic and Statistical Manual of Mental Disorders IV. The DSM IV identifies cruelty to animals or humans, as part of an aggressive conduct disorder (American Psychiatric Association, 1994). Thus, the experience of pain is relevant to humans as evidenced by the legal and

medical and psychological codes just mentioned. However, the identification of the animal experience of pain as a result of human behaviour as morally considerable, serves to include non-humans within the human moral community, on the basis of their capacity for sentience.

Indeed, in Australia, infliction of pain on an animal carries a maximum legal penalty of ten thousand dollars or imprisonment for twelve months (Australian Prevention of Cruelty to Animals Act, 1985. No 106. Section 13). The strong legal sanctions against the infliction of pain would indicate that animal's experience of pain should be morally considerable. The RSPCA for instance is opposed to the infliction of pain and suffering on any animal in the name of sport (RSPCA, 1997), while painful veterinary procedures without anaesthetic are illegal and unethical (Tannenbaum,1993). Thus, while the ethical sentientism approach is colloquially associated with the animal rights movement (Taylor, 1996), the importance of sentience, evidenced by a capacity to feel pain, is clearly demonstrated in many human social institutions.

Overall, the sentience of an entity is therefore seen to be an important consideration in human treatment of that entity. There appears to be general community intolerance of the infliction of pain on humans and animals. The evidence, from international conventions, the medical, legal, psychological, and animal welfare organisations, indicates that sentience is a morally considerable characteristic. Given this evidence it seems defensible to presume that sentience may form a basis for ethical treatment.

The capacity for sentience

Because sentience appears to be a morally considerable characteristic, it becomes important to discuss exactly which entities have this characteristic, and which ones do not. Distinguishing between those entities that are sentient, and those that are not is an issue of scientific and philosophical concern (Tannenbaum, 1993). The physiological systems and structures that enable the perception of painful stimuli are basically the same in vertebrate animals and humans (Kitchen et al., 1987). If the physiological structures are the same, then there is good reason to believe that they perform the same functions in whatever animals these structures exist (Singer, 1975). The conclusion therefore appears simple, animals- especially the so-called "higher" animals, probably can feel pain.

As identified earlier there are two aspects to sentience, the capacity to receive sensation, and the consciousness or mental experience of that sensation. Hills (1995) asserted that an important aspect of sentience is the presumed mental experience of animals. However, as Bowd (1980) reported, in relation to animal experimentation, animals are generally assumed to have no mental experiences. This assumption is important since it serves to exclude such animals from moral consideration according to a sentience ethic. Clearly however, as Patterson (1978) showed, a sentience ethic could apply to certain animals since many tasks performed by humans are also within the mental capacity of some animals (eg: primates), thus indicating a definite cognitive mental experience. There is also evidence to indicate that non-humans have emotional experiences as well. For instance Lascelles' (1996) finding that an important factor in the control of pain in companion animals was human stroking and talking to the animal. For herd animals, Lascelles found that, allowing visual contact with other animals is an

important adjunct to drug therapy in pain reduction. Lascelles findings suggest the importance of emotional aspects to animal experience. Additionally, Wiepkema and Koolhaas, (1992) have claimed that classical conditioning experiments with vertebrate animals, have shown that animals are able to detect causal order in their environment, and that they respond emotionally to the knowledge that they gain by their detection of causal order. Rowan (1988) and Wiepkema and Koolhaas (1992) have claimed that animals' emotional response is indicated by behaviours, for example tail movements or vocalisations, and physiologically by heart rate and neuroendocrine changes. Overall there is much evidence to indicate that animals do feel pain, and that it is likely that there is a mental experience associated with the pain.

Generally however, as one moves further away from humans along the presumed phylogenetic chain, the arguments for sentience become progressively less defensible (Eismann, et al., 1984). In support of this assertion, Plous (1993) found that the rank ordering of ratings of similarity to humans and ability to feel pain ratings were identical for six animal categories. Thus, animals that were rated very similar to humans received higher ability to feel pain ratings while those rated as most dissimilar to humans received the lowest ability to feel pain ratings. However, the issue of animals' capacity for sentience is still contentious. For example, Gentle (1992) reported finding no major differences in pain indicators between mammals and birds and therefore claimed that the moral considerations normally afforded to mammals should also be afforded to birds. By contrast Fraser (1977) contended that birds are at the bottom of the sentient range with cold-blooded animals, that he described as subsentient. Fraser's position contrasts sharply with Dionys de Lew's position. In a review of the literature, Dionys de Lew

(1993) claimed that fish are sensitive to pain, have memory, and are capable of learning,- and like all living things are fundamentally interested in avoiding pain and their own survival. This interest in survival is not different from the survival interest that other animals have, for example, humans. According to a sentience ethic then, an interest in avoiding pain would certainly indicate a level of sentience deserving of moral consideration.

According to Singer (1975), molluscs and arthropods represent entities on each side of the sentience divide. Thus, molluscs would be considered insentient since they appear to lack the physiological apparatus necessary for the experience of pain, while arthropods, which appear to have the requisite bits and pieces, were deemed by Singer to be sentient. In the case of insects however, Eisemann et al. (1984) has claimed that insect's lack of physiological similarity to humans was not evidence of an inability to experience pain. Clearly however, behavioural observations, and the evidence of insect's neural organisation do not support the argument for the existence of a pain-like state in insects that is similar to the human pain experience (Eisemann et al., 1984; Wiepkema & Koolhaas, 1992). Similarly, the apparent lack of neural networks in plants supports the general belief that plants are less sentient than any animals (Tompkins & Bird, 1993). Thus, while Singers argument may establish one of many possible lower limits to sentience, it is clear that there is a range of beliefs about what entities are sentient, and how much they may be sentient. This range of beliefs has important implications for human behaviour towards non-humans if human behaviour is indeed based on a sentience ethic.

Ecosystemic ethics

An ecosystem ethic presumes that entities get, or are deserving of, moral consideration because of their value in an ecological or ecosystemic sense. Thus, where sentience may form one basis of moral consideration, a second possible basis of moral consideration according to Fox's (1995) model is the ecosystemic integrity that an entity possesses. Integrity in this sense refers to the capacity of the ecosystem for self-regeneration (Fox, 1995). According to Katz (1992), the individual biological organisms within an ecosystem must be considered as nodes in a web of intrinsically related parts. An environmental ethic therefore must consider the ecological system itself, as being a morally considerable entity. Further, according to an ecosystem ethic, because the ecosystem is an integrated whole, actions which would threaten its parts are seen to threaten the integrated whole, and would be subject to the same moral rules. (Katz, 1992). Thus, an ecosystem ethic is about the moral consideration of an entire ecosystem as if it were a single entity. Throughout this paper the term ecosystemic integrity will be used to refer to the quality (in a similar way that sentience refers to a quality) that is presumed to confer moral considerability.

The theoretical argument for an ecosystem ethic

The basis of Fox's (1995) ecosystem ethics is what Fox calls the autopoietic nature of ecosystems. Autopoiesis "refers to the fact that living systems continuously strive to produce and sustain their own organisational acitivity" (Fox, 1995 p 169). Therefore, all living things are autopoietic. However some things, like ecosystems, that

are not traditionally considered living in the individual biological sense - the way that a mouse is for instance - may be considered to be self-regenerating wholes because they continually maintain their integrity. For example, a mangrove swamp maintains itself by the cycling of materials.

Fox (1995) argues that if an ecosystem is self regenerating then it can be said to have interests. In Singers' (1975) terms, to have ones interests thwarted is to suffer[3] Cassell (1982), in a discussion of human suffering, has argued that suffering occurs when the integrity of a person [any self-regenerating whole] is compromised or threatened in some way. If the integrity of an ecosystem can be compromised and threatened, then clearly it can suffer. Whether it does so consciously or not is irrelevant here. For example, an unconscious person clearly has interests and there is no logical reason for the unconscious person to be aware of those interests before those interests become the subject of moral consideration by other people. Thus, to the extent that an entity is a self-regenerating whole - whether it is conscious or not - it can be said to have interests[4]. Since the ecosystem is capable of being damaged, and this damage may threaten its ability to self-regenerate, it is deserving of moral consideration in the same way that life itself is deserving of moral consideration (Fox, 1995).

The concept of ecosystemic integrity as a basis for an ethic is observable in Leopold's A Sand County Almanac. Leopold (1949) has written, "A thing is right when it tends to preserve the integrity, beauty and stability of the biotic community. It is wrong when it tends otherwise" (p. 224-225). Leopold's concept of a land ethic has been refined by Heffernan (1982) who stated that "a thing is right when it tends to preserve the

[3] Singer however, would argue, that since the ecosystem is not sentient it cannot "suffer" at all.

characteristic diversity and stability of an ecosystem (or the biosphere). It is wrong when it tends otherwise" (p. 236). The concept has been widely adopted by others. For instance Wildes (1995) used the term ecosystemic holism to refer to the idea that the morality of any action depends upon its impact on an ecosystem or the wider ecocomplex. Other labels in the philosophical literature for the same concept include ecosphere ethics, ecosystem ethics or Gaian ethics (Fox, 1995), or ethical holism (Taylor, 1996).

The applied argument for an ecosystem ethic

There is much evidence that demonstrates the importance of ecosystemic integrity as a basis for moral consideration. The moral relevance of the ecosystemic integrity concept is recognised at the international level. For instance, the United Nations Environment Programme recognised the ethical basis of preservation of the Earth's biodiversity (Heywood, 1995), and the World Conservation Strategy identified preservation of genetic diversity as a matter of moral principle (International Union for the Conservation of Natural Resources, 1991).

Similarly, at the national level, The Australian Biodiversity Unit (Australian Department of Environment, Sport and Territories,1993), stated that the sheer diversity of life is of high and inestimable value. In 1995, a national Biodiversity Campaign was launched in Australia with the aim of conserving biodiversity (Australian Department of Environment, Sport and Territories: Biodiversity Unit, 1995)

[4] Fox further argues, somewhat tautologically, that since the self-renewing system is an end-in-itself, it qualifies as intrinsically valuable on this basis alone!

Further, the National Strategy for the Conservation of Australia's Biological Diversity (Australian Department of the Environment Sport and Territories: Biodiversity Unit,1995) recognised the community view that protection of biological diversity has an ethical basis, and that the environment is deserving of protection for this reason, independently of its utility to humans. The importance of ecosystems as an object of moral concern is further demonstrated by The Australian Endangered Species Protection Act. Section three of the Act has as its focus, the protection of ecosystems or ecological communities (defined as an integrated assemblage of native species) (Endangered Species Protection Act, 1992). The purpose of the Act is to protect from destruction, and promote the continued existence of ecological communities.

At the State level, The Western Australian Department of Conservation and Land Management (1997) has as one of its aims, the conservation of ecosystems. Similarly, the Royal Society for the Prevention of Cruelty to Animals recognises the importance of habitat systems as deserving of protection. The RSPCA (1997) recognises the inter-relationship between all living species and aims to preserve and increase the gene pools of endangered species, and to promote biodiversity (RSPCA, 1997).

Thus there are many declarations from important political and social institutions to indicate that ecosystems, as functioning wholes, warrant moral consideration. This evidence suggests that ecosystems are particularly important to humans, and defines at least one aspect of that importance, as a moral importance. Thus it seems defensible to presume that ecosystemic integrity may form a basis for ethical behaviour towards non-humans.

In a functional sense ecosystemic integrity refers to those characteristics which contribute to the self-regenerative capacity of the ecosystem. Clearly the focus of the theoretical argument for moral consideration of an ecosystem is the whole ecosystem as a single entity. In practice however it is often a particular aspect, entity, or sub-process within the self regenerating whole that becomes the focus of arguments and actions that have as their ultimate aim, the protection of the integrity of the ecosystem (Fox, 1997). In practice then, the rationale for protection of krill or seagrasses for example, may not relate directly to krill or seagrasses themselves- but instead to the larger system of which it is an integral and essential part for the self-regeneration of the larger whole. Thus, the narrow focus of an ethic based on ecosystemic integrity may be an individual entity that plays an essential part in the maintenance of the integrity of the larger whole. The broad focus however remains on the larger integrated system. Thus, seagrasses (narrow focus) may be protected to maintain the larger system (broad focus).

In summary, Fox's model describes two intrinsic-value ethical bases of sentience and ecosystemic integrity, that he presumes to exist. Fox supports his presumption on phenomenological grounds. Of course, these presumed ethical bases remain hypothetical constructs rather than empirically validated concepts. Psychology, as an empirical science, and the science of human behaviour, is obliged to test these ideas. For the purposes of this discussion assume that Fox's ethical bases <u>do</u> exist. Given this assumption, how can humans behave so destructively towards the non-human world when this behaviour violates some basic ethical code?

Disregarding the shallow responses to this question; for example- "Because they want to behave this way", or, "They need to live"; there must be some deeper intervening

process that permits behaviour that is clearly against the presumed moral code. Of course the intervening process may be very likely related to simple desire or the need to live- but the question remains- what is that process, and how may an understanding of the process contribute to greater protection of the non-human world? One process that may be relevant here is related to the scope of justice.

The Scope of Justice

The scope of justice "is the psychological boundary within which considerations of fairness and moral rules and values govern our conduct (Opotow, 1993 p. 72)". If an entity is included within the human scope of justice then it will be the subject of moral consideration and will be treated fairly. If an entity is outside the scope of justice then moral considerations do not apply and there are no internal moral obligations towards the entity (Opotow, 1993).

Traditionally the scope of justice, or boundary of moral consideration has been set at the species boundary between humans and non-humans (Rawls, 1971). Plous (1993) for instance has argued that human behaviour towards animals is closely tied to out-group biases that result from species membership. However Schweitzer's (1965) belief was that all life should be included within the moral boundary. An even more inclusive scope of concern is endorsed by Leopold (1949) who claimed that soils, water, plants, animals and collectively, the land should be subjects of moral concern. However, Crosby and Pearsall-Lubin (1990) stated simply that different people have moral communities, or scopes of justice, that vary in their level of inclusiveness or exclusiveness. By contrast, Deutsch (1990) claimed that moral exclusion represents an internal pathology that may

flare up in times of hardship. Thus, ones scope of justice reflects ones range of moral concern and is a flexible construct (Crosby & Pearsall-Lubin, 1990). Opotow also argued that the scope of justice is flexible in cultural and historical contexts (Opotow, 1993). For instance, behaviours such as whaling which were historically morally acceptable, are now less acceptable to some cultures (Opotow, 1993). In an operational sense, ones scope of justice relates to the preparedness to allocate resources to others, a willingness to share resources with others and a willingness to make sacrifices to promote the well-being of others (Opotow, 1993).

Attributes of non-humans, and the scope of justice

Partridge (1996) contended that the moral community cannot be any larger than the human community. He further argued however that if the moral community were to be extended, then at its furthest limits it may include sentient beings. Fox's (1995) model, and the earlier discussion in this paper suggests that entities which possess the characteristics of sentience and ecosystemic integrity are worthy of moral consideration and may be included within the scope of justice.

Empirically, Opotow (1994) has found that inclusion within the scope of justice was influenced by aspects of similarity to humans. When a non-human entity (beetle) had attributes of similarity (complexity) and utility to humans, the human scope of justice was expanded and this resulted in increased inclusion of the beetle in the human scope of justice, and the subsequent protection of the beetle. A second aspect of similarity, intelligence, contributed to the beetles' non-inclusion within the scope of justice, and subsequently to its non-protection when conflict between the beetles and humans was

high. Opotow's (1994) empirical work indicates that the scope of justice is a flexible construct that is responsive to the non-human entities' characteristics of similarity to humans, and utility to humans.

Conflict with non-humans and the scope of justice

Opotow (1994) identified the level of conflict between the humans and the beetle, or their relative need as a second factor which influences inclusion within the scope of justice. During high conflict with non-human others, the human scope of justice may shrink, and the non-human may then fall outside the scope of justice. During times of low conflict, the scope of justice may expand, and the previously excluded entity may be included within the scope of justice (Opotow, 1996). Thus, the scope of justice is seen as an elastic boundary that enlarges or contracts in response to conflict or perceptions of relative need, and human perceptions of the attributes of the non-human entity.

Delegitimisation

A concurrent process that may occur that contributes to exclusion from the scope of justice is the process of delegitimisation (Bar-Tal, 1990). Delegitimisation refers to discounting of the amount of some desirable attribute possessed by another (person) in times of conflict. Plous (1993) suggested that perceived differences in the ability of non-humans to feel pain, may be an outcome of exaggerations resulting from out-group characterisations of the non-humans by humans. Delegitimisation may result in lower reported levels of some desirable quality of the non-human (for example- sentience, or ecosystemic-integrity) when there is conflict between the humans and the non-humans.

Because the perception of the desirable quality is reduced, the perception of the legitimate right of the non-human, to whatever the conflict is about (for example- a wetland) may also be reduced (Plous, 1993).

Because the perception of legitimate right is reduced, it becomes easy for the oppressors (humans) to justify their denial of any rights of the non-human (Bandura, 1990). Once begun, the process of delegitimisation contributes to further delegitimisation (Weston, 1996). Thus, delegitimisation of the non-human entities' capacity for sentience, or its ecosystemic integrity, would represent a fundamental step towards its exclusion from the human scope of justice, and its subsequent non-protection. Plous (1993) has therefore claimed that people commonly reduce their internal conflicts in relation to animal treatment by conceding that animals feel pain, but denying that animals are intelligent enough or self-aware enough for their pain to matter. Therefore, one process that ultimately allows non-protection of non-humans is a process of delegitimisation. Alternatively, as Opotow (1994) has identified, scope of justice considerations may be relevant where there is a perception of high need by the non-human, which may result in inclusion within the scope of justice, and therefore, protection of the non-human.

The level of protection afforded to a non-human entity may therefore be an outcome of several processes. These include, the level of conflict between the humans and the non-humans, characteristics of the non-human entity such as sentience and ecosystemic integrity, delegitimisation processes related to characteristics of the non-human, and the influence of scope of justice considerations.

The present study

The purpose of the present study was to examine the influence of the attributes of sentience and ecosystemic integrity of a non-human entity in high or low conflict with humans, on the subsequent level of protection of the non-human entity by humans. Additionally, the study aimed to examine the role of the scope of justice, and delegitimisation processes in the protection decision.

The characteristics of interest for their contribution to protection, were sentience and ecosystemic integrity. For the current study the sentience of a fictional entity, the Marsh Dodder, was manipulated by describing the Marsh Dodder as either a plant, a crab, a feeling crab, or as a feeling thinking crab. Thus, the sentience of the Marsh Dodder ranged from objectively zero, to highly sentient. The low sentience condition was represented by the plant since plants are generally presumed to be non-sentient (Tompkins & Bird, 1993). The highest sentience, condition was represented by the thinking-feeling crab, which represent two aspects to sentience, the ability to feel, and the mental capacity to make sense of the experience of pain. Two intermediate levels included the crab, and the feeling-crab. The ecosystemic integrity was manipulated by describing the Marsh Dodder as important to other creatures, or as not important to other creatures. High conflict was manipulated by describing the Marsh Dodder as currently living in only two wetlands, one of which was wanted by the humans, and where human use of the wetland would destroy the Marsh Dodder. Low conflict was manipulated by describing the Marsh Dodder as living in many wetlands.

Research Questions

Do aspects of sentience and ecosystemic-integrity of a non-human entity directly influence its protection?

Do aspects of sentience and ecosystemic-integrity of a non-human entity result in increased inclusion within the scope of justice?

Does the scope of justice mediate the possible effects of sentience and ecosystemic-integrity on protection of non-human entities?

Is high conflict associated with exclusion from the scope of justice?

Does delegitimisation of non-humans occur when humans are in conflict with non-humans?

Scope of Justice Scale development

Five constructs relevant to a presumed scope of justice were identified from the literature. Three constructs were taken from Opotow's (1994) Scope of Justice scale. They included, considerations of fairness, willingness to sacrifice, and willingness to allocate a share of resources. An additional two constructs were taken from Clayton (1994). They were, procedural justice, and responsibility. An initial ten-item scale was developed with two questions addressing each construct. A declared preliminary pilot

administration of the scale to 15 university students resulted in minor corrections to format and grammar.

Pilot testing

Participants and procedure for the pilot study

The pilot sample contained 115 Perth rail commuters travelling on weekdays during the approximate hours of 10:00 am to 4:00 pm. It was expected that members of the general public would participate in the final study. Train travellers represented an easily accessible portion of the general public for the purposes of questionnaire development. Participants were approached individually and invited to participate in research about wetlands, which would take about ten minutes. Participants completed questionnaires while seated travelling on the train. Participants were then invited to ask questions about the research and informed of the purpose of the research. The pilot study had two purposes. First, to develop the Scope of Justice scale, and second, to check experimental manipulations.

Scope of Justice Scale Reliability

Principal components analysis using Varimax rotation was conducted on the ten Scope of Justice items. One factor emerged. Factor loadings are shown in Table 1. Deletion of questionnaire items not loading heavily on this factor resulted in a six-item scale with a Cronbach's alpha of .84.

Table 1

Factor Loadings for Scope of Justice Scale Items

Scale item	Factor loading
Equal access to all the earth offers	.73
Equal sacrifice by both parties	.79
Equal rights for both species	.78
Fair share of resources	.70
Equal right for own purposes	.76
Suffer same amount and type of loss	.69

Experimental Manipulation Checks

The pilot questionnaire used a fish as the subject of the vignettes. However, results indicated some problems with the experimental manipulation of sentience for the fish. Problems related to an apparent resistance by participants to the suggestion in some experimental manipulations that fish could not feel pain. For the main study, the fish was changed to a crab. The sentience of the crab was expected to be more easily manipulated because crabs (crustacea) represent an even "lower" class of animals than fish, according to the phylogenetic order. Therefore, according to Plous' (1993) general findings, people would believe that crabs would be less likely to feel pain. Additionally, two extra sentience conditions were included. The extra sentience conditions included a plant- which is objectively non-sentient, and a crab described as a feeling-thinking-crab, to

include aspects of intelligence. The sentience manipulation therefore described a fictitious entity- a Marsh Dodder, that was described as either, a plant, a crab, a feeling-crab, or a thinking-feeling-crab. Statistics for the main study manipulation of ecosystemic-integrity, sentience, and conflict are presented in the next sub-sections.

Ecosystemic Integrity

A comparison of means for the two experimentally manipulated levels of Ecosystemic Integrity showed significant differences between the two groups on the continuous measure of integrity, high integrity $n = 330$, ($M = 7.53$ S.D. $= 1.61$); low integrity, $n = 307$, $M = 5.27$ S.D. 2.55; $t(635) = 13.45$, $p < .001$.

Conflict

The questionnaire contained two items that assessed participant's ratings of the extent of need of the humans, and of the Dodder. To obtain a measure of relative need, the need score for the humans need was subtracted from the score for the Dodders' need. A comparison of the two need conditions (Dodder lives in two wetlands / Dodder lives in many wetlands) indicated significant differences existed between the groups on the continuous measure of relative need, high need group, $n = 304$, $M = 3.6$ S.D. $= 3.66$; low need group, $n = 333$, $M = 2.01$, S.D. $= 3.72$; $t(635) = 5.415$, $p < .001$). Where the need of the Dodder was high, high conflict was deemed to exist between the Dodder and humans.

Sentience

Sentience comprised two aspects, ability to feel pain, and intelligence. A One-way-ANOVA indicated that significant differences existed in reported ability to feel pain for the

four experimentally manipulated levels of sentience $F(3,633) = 97.72$, $p < .001$) Tamhanes post hoc analyses revealed that significant differences existed between the plant and all other conditions of sentience, with ratings of ability to feel pain being the lowest for the plant condition. Significant differences also existed between the crab and all other sentience conditions. No significant differences existed between the thinking-feeling-crab, and the feeling-crab, in ability to feel pain. Results are shown in Table 2.

A One-way-ANOVA indicated that significant differences existed in reported intelligence for the four experimentally manipulated levels of sentience $F(3,633) = 59.37$, $p < .001$) Post hoc analyses revealed that significant differences existed between all conditions ($p < .001$) with the exception that no significant differences existed between reported intelligence of the crab and feeling crab. ($p = .061$). As shown in Table 2, ratings for the intelligence of the plant were the lowest. Taken together, these results indicated that the experimental manipulations were successful.

Table 2

Mean Ratings of Dodder's Ability to Feel Pain, and Intelligence in Each Sentience Condition.

		Can the dodder feel pain?		Is the Dodder intelligent?	
Sentience condition	n	M	SD	M	SD
Plant	164	3.16	2.92	2.63	2.50
Crab	150	6.22	2.44	4.16	2.37
Feeling-crab	147	7.12	1.93	4.86	2.35
Feeling-thinking-crab	176	6.95	2.07	6.00	2.29

Note- Possible range 0-9, with high scores indicating high ability to feel pain or high intelligence

Method

Participants

Participants in the sample were all students of Edith Cowan University. The final data set comprised students from various faculties in the following percentages: Business, 52% (184 females, 141 males); Education 22% (115 females, 18 males); Science10 % (26 females, 39 males), and Health and Human Services 17% (54 females, 52 males). The total sample therefore comprised 637 participants (385 females and 282 males).

The age of participants in the sample ranged from 18 to 38 years. (18 to 24 years, 82%; 25 to31 years-15%; 32-38 years 4%)

The sample included the following percentages of descriptions of cultural identity:

71% (448), Australian,

15% (99), Asian,

5% (31), European,

4% (25), Britian,

1% (5), New Zealand,

4% (26), Other.

Ethical Considerations

Students' participation was anonymous and voluntary. Contact details of the researcher were displayed throughout the presentation period. Participants' responses to the research appeared to range from indifference to enthusiasm.

Materials

Standard Introduction

A standard verbal introduction (Appendix A) introduced the researcher, the research area, and the research instrument.

The Questionnaire

The questionnaire developed during the pilot stage of the research was amended and used for the main study. The first page of the research instrument contained a very brief introduction to the research and brief instructions for completion. Additionally, the first page contained one of sixteen vignettes that represented the experimental manipulation. The first page of each of experimental condition is presented in Appendix B. The remaining two pages of the questionnaire were identical for all experimental conditions. The remaining pages included the scope of justice scale (Cronbachs alpha, .84), manipulation checks, free response items relating to the wetland allocation decision, Likert scale questions related to allocation of the wetland, and Likert scale questions tapping the relative needs of the human and the Marsh Dodder (Appendix C).

An overhead transparency slide showing contact details of the researcher and Supervisor, and definitions of terms used in the questionnaire was displayed throughout the presentation (Appendix D).

Debriefing Information

Following completion of the questionnaire participants were informed about the real purpose of the research and invited to ask questions.

Procedure

Obtaining the main study sample

The sample for the main study was obtained by personally approaching lecturers from a variety of faculties within Edith Cowan University. Following initial contact, arrangements were made to present the questionnaire to intact lecture groups at the conclusion of the allotted lecture time. Students were selected because they were an easily accessible sample.

Administering the questionnaire

Questionnaires were administered over a two-week period covering the second and third weeks of second semester. Questionnaires were generally administered to lecture groups at the conclusion of the lecture. One lecture group completed questionnaires at the start of a tutorial immediately following the lecture. A second lecture group completed the questionnaire at the beginning of the allotted lecture time. In total, eight lecture groups completed questionnaires. To balance conditions for statistical purposes, additional potential participants were approached individually in University libraries and invited to participate in the research. Thirty participants were obtained by this method. During administration to lecture groups and individuals, the researcher gave a standard verbal introduction. (Appendix, A). Participants took about ten minutes to complete the questionnaire. Questionnaires were then handed in and participants were debriefed.

Sampling procedures

An approximately equal number of participants from within each class group were allocated to each experimental condition. To facilitate debriefing, the vignettes requiring the shortest reading time were distributed last so that most participants finished at about the same time. This method was expected to promote participation in debriefing. Starting points to begin the distribution of questionnaires were randomly chosen for each class group. This method was expected to ensure that participants who sat in particular areas of the lecture room, did not as a group, consistently receive particular vignettes. Overall, this method constituted random assignment to experimental conditions. It was estimated that approximately 15% percent of students invited to participate in the research chose not to do so.

After completion of debriefing, participants were invited to contact the researcher with any questions they may have had. No participants subsequently initiated any other contact in relation to the research.

Scoring

Each participant's scores on the six Scope of Justice items were summed to yield a Scope of Justice total with a possible range of zero to fifty-four.

The response scale for the dependent variable Allocate, was an eleven-point scale that ranged from, Exclusively for the Human Species to, Exclusively for the Marsh Dodder Species. The mid-point on the scale was represented by zero. For statistical purposes scores that indicated allocation to the Dodder were arbitrarily assigned positive

values and scores that indicated allocation to the humans were arbitrarily assigned negative values.

In instances where a participant had recorded two responses for other Likert scale items, the arithmetic mean was calculated, rounded to the next whole integer, and recorded as the participants score on the item. Similarly, where participants indicated that their response was between two adjacent Likert scale options, the response was deemed to have been the higher of the pair.

Feedback to participants

Participants were informed that at the end of semester, a summary of results would be presented to participants in corresponding lectures, and /or placed on faculty notice boards.

Results

Data screening and preparation

Seven hundred and eighty two students participated in the research. Ninety-eight participants had missing data and 47 cases were identified as multivariate outliers, leaving a total of 684 cases for analysis.

Normality, homogeneity of variance, homogeneity of regression

Data were negatively skewed for the dependent variable, Allocate. However, due to large sample size, violations of normality assumptions were not deemed to present problems for analysis. Assumptions of homogeneity of variance were met for the dependent variable Allocate, however, assumptions of homogeneity of variance were not met for the intended covariate Scope of Justice. Homogeneity of regression assumptions were met for the ANCOVA model with Conflict, Ecosystemic Integrity, and Sentience as factors, with Scope of Justice as the covariate for the dependent variable Allocate (See Appendix D for computer printout of homogeneity of regression results).

Scope of Justice

A 2 x 2 x 4 Analysis of Variance was conducted on the scope of justice using the independent variables, conflict (high / low), integrity of the Dodder (high / low) and sentience of the Dodder (plant / crab / feeling-crab / thinking-feeling-crab). The ANOVA analysis indicated no significant main effects and no significant interactions for the dependent variable scope of justice. Thus, the scope of justice appeared unresponsive to experimental manipulations. ANOVA results are presented in Table 3. Descriptive statistics for the ANOVA model with Scope of Justice as the dependent variable are presented in Table 4. (See Appendix F for computer printout of results).

Table 3

Anova Summary for the Scope of Justice

	Df	MS	F	Significance
Conflict	1	27.586	.222	.638
Integrity	1	134.830	1.058	.298
Sentience	3	99.682	.802	.493
Conflict by integrity	1	27.404	.220	.639
Conflict by sentience	3	180.296	1.451	.227
Integrity by sentience	3	80.72	.649	.584
Conflict by integrity by sentience	3	254.007	2.044	.107
Error	621	124.290		

Note. N = 637

ANOVA Analysis for Allocation of Wetland

A 2 x 2 x 4 Analysis of Variance was conducted on the dependent variable Allocate using the independent variables conflict (high/low), integrity of the Dodder (high / low) and sentience of the Dodder (plant / crab / feeling-crab / thinking-feeling-crab). The ANOVA analysis revealed significant main effects for conflict, integrity and sentience. Results are summarised in Table 5. (See Appendix G for computer printout of results).

Table 4

Means and Standard Deviations for Scope of Justice

Condition	N	M	SD
Conflict			
Low	333	28.85	.616
High	304	29.27	.643
Integrity			
Low	307	28.60	.640
High	330	29.53	.619
Sentience			
Plant	164	28.95	.874
Crab	150	28.0	.912
Feeling-crab	147	29.44	.922
Feeling-thinking-crab	176	29.86	.850

ANCOVA Analysis for Allocation of Wetland

The scope of justice literature indicates that protection increases as the scope of justice increases. It was therefore expected that the scope of justice would act as a covariate and possibly mediate the direct effects of sentience, ecosystemic integrity, and conflict on the dependent variable allocate. The overall correlation of scope of justice with allocate was small but significant ($r = .155$, $p < .01$).

Table 5

ANOVA Summary of Allocate for Conflict, Integrity and Sentience

Factor	Df	MS	F	Significance	Effect size	Observed power
Conflict	1	259.13	35.302	<.001	.054	1.00
Integrity	1	244.457	33.303	<.001	.051	1.00
Sentience	3	35.476	4.833	.002	.023	.905
Conflict by Integrity	1	.156	.021	.884	<.001	.052
Conflict by sentience	3	8.575	1.168	.321	.006	.315
Integrity by sentience	3	14.074	1.917	.126	.009	.497
Conflict by integrity by sentience	3	2.429	.331	.803	.002	.115
Error	621	7.34				

Note. n = 637

A 2 X 2 X 4 Analysis of Covariance was conducted on the overall allocation of the wetland. Independent variables were, conflict (high/low) integrity of the Dodder (high / low) and sentience of the Dodder (plant / crab / feeling-crab / thinking-feeling-crab). The covariate was the scope of justice.

Analysis of Covariance, indicated that scope of justice made a significant, but small adjustment to allocation scores. Significant main effects were found for conflict, integrity and sentience. There were no significant interactions. Results are summarised in Table 6. As indicated by the small effect sizes, the strength of the relationship between aspects of

sentience, integrity and conflict with the dependent variable allocate, was weak. (See Appendix H for computer printout of results).

Post hoc analyses using Tukeys HSD indicated that the allocation was lower for the lowest sentience group, plant (M = 0.12; SD = 2.89) than either of the higher sentience groups, crab,(M = 1.03; SD = 2.96) or feeling-thinking crab, (M = 1.17; SD = 2.65). No significant differences existed between the feeling-crab and any other condition.

When the scores on the dependent variable allocate were adjusted by the introduction of the covariate scope of justice, the main effects did not change and interactions did not emerge. This result indicates that the weak covariate effects of the scope of justice did not mediate the influence of conflict, sentience, or integrity, on allocation of the wetland.

Descriptive statistics for the ANOVA model, rather than the ANCOVA model are therefore presented in Table 7. Table 7 shows that the allocation of the wetland to the Dodder (and therefore protection of the Dodder) was most likely to occur when the Dodder was highly sentient, highly integrated into its ecosystem, and where conflict was high.

In experimental conditions where ecosystemic integrity was low, and where conflict was low the wetland was not allocated to the Dodder, as shown in Table 8. The means for each experimental condition presented in Table 8 show generally consistent trends for allocation for each variable, except for some inconsistencies related to the feeling crab. In most conditions however, the Dodder was protected as indicated by scores above zero on the dependent variable Allocate.

Table 6

ANCOVA Summary for Allocation with Covariate Scope of Justice

Factor	Df	MS	F	Significance
Scope of justice	1	95.787	13.308	<.001
Conflict	1	253.120	35.167	<.001
Integrity	1	231.428	32.153	<.001
Sentience	3	34.678	4.818	.003
Conflict by integrity	1	.044	.006	.937
Conflict by sentience	3	7.445	1.034	.377
Integrity by sentience	3	12.086	1.679	.170
Conflict by integrity by sentience	3	2.417	.336	.800
Error	620	7.198		

Note. N = 637

Table 7

Marginal Means for ANOVA model of Allocation for Conflict, Integrity, and Sentience

Levels of ANOVA factors		n	M	SD
Integrity	Low	307	0.13	2.85
	High	330	1.33	2.77
Conflict	Low	333	0.17	2.81
	High	304	1.39	2.80
Sentience	Plant	164	0.12	2.89
	Crab	150	1.03	2.96
	Feeling-crab	147	0.67	2.89
	Feeling-thinking-crab	176	1.17	2.65

Delegitimisation

Delegitimisation refers to the discounting of a positive attribute in another entity, usually during conflict, in order to escape a sense of moral obligation to the other entity. In the current study high conflict was present between the humans and the Dodder when the Dodder lived in only two wetlands, (high Dodder need). In these cases the Dodder had a high need for the wetland, and so did the humans. Delegitimisation would be indicated by lower ratings of the Dodder's ability to feel pain, its intelligence, and level of integration, in the high need condition when compared to the low need condition.

Table 8

Mean Scores and Standard Deviations for ANOVA Factors on the Dependent Variable Allocate

	Ecosystemic integrity								
Sentience		Low			High			Row	
Conflict	n	M	SD	n	M	SD	N	M	SD
Plant									
Low	38	-1.13	2.47	45	-0.40	2.96	83	-0.73	2.76
High	44	0.41	2.76	37	1.70	2.67	81	1.0	2.78
Crab									
Low	34	-0.71	2.76	41	1.73	2.45	75	0.63	2.85
High	37	0.51	3.21	38	2.32	2.57	75	1.43	3.02
Feeling-Crab									
Low	36	-0.31	2.85	41	0.80	2.85	77	0.29	2.85
High	37	0.57	3.09	33	1.70	2.59	70	1.10	2.90
Feeling-Thinking-Crab									
Low	47	0.04	2.64	51	0.88	2.62	98	0.48	2.65
High	34	1.68	2.37	44	2.32	2.43	78	2.04	2.41

Note. Possible range of Allocate minus 5 to 5, high scores mean allocation to the Dodder

Delegitimisation of intelligence

To test for the occurrence of delegitimisation of the Dodders intelligence, a 4 X 2 ANOVA was conducted for the four levels of sentience and the two levels of conflict. Results revealed no significant main effects for conflict on reported intelligence of the Dodder, $F(1,637) = .451$, $p = .502$. A significant main effect was found for sentience, $F(3,637) = 59.586$, $p < .001$. There were no interactions present between conflict and sentience. This result indicates that delegitimisation of the Dodder's intelligence in the high conflict condition had not occurred. Mean scores and standard deviations are presented in Table 9. (See Appendix I for computer printout or results).

Delegitimisation of ability to feel pain

To test for the occurrence of delegitimisation of the Dodders ability to feel pain a 4 X 2 ANOVA was conducted for the four levels of sentience and the two levels of conflict. A significant main effect was present for conflict, $F(1,637) = 5.076$, $p = .025$. A significant main effect was present for sentience, $F(3,637) = 98.726$, $p < .001$. This result indicates that delegitimisation of the Dodder's ability to feel pain in the high conflict condition had occurred. Means and standard deviations of reported ability to feel pain are shown in Table 10. (See Appendix J for computer printout of results).

Table 9

Mean Scores and Standard Deviations for, Is the Dodder intelligent? For each Objective Sentience Condition (possible range 0-9).

	Plant		Crab		Feeling crab		Feeling thinking crab	
	M	SD	M	SD	M	SD	M	SD
Low-conflict	2.55	2.47	4.49	2.22	5.01	2.40	5.86	2.32
	(n=83)		(n=75)		(n=77)		(n=98)	
High-conflict	2.70	2.55	3.83	2.47	4.70	2.29	6.18	2.25
	(n=81)		(n=75)		(n=70)		(n=98)	

Table 10

Mean Scores and Standard Deviations for, Can the Dodder Feel Pain? for each Objective Sentience Condition (possible range 0-9)

	Plant		Crab		Feeling crab		Feeling thinking crab	
	M	SD	M	SD	M	SD	M	SD
Low conflict	3.43	2.98	6.68	2.16	7.36	1.69	6.83	2.15
	(n=83)		(n=75)		(n =77)		(n=98)	
High conflict	2.89	2.86	5.76	2.62	6.86	2.15	7.10	1.96
	(n=81)		(n=75)		(n =70)		(n=98)	

Delegitimisation of ecosystemic integrity

To test for the occurrence of delegitimisation of the Dodder's integrity a 2 X 2 ANOVA was conducted for the two levels of integrity and the two levels of conflict. A significant main effect was not present for conflict, $F(1,633) = .164$, $p = .686$. A significant main effect was present for integrity, $F(1,633) = 180.798$, $p < .001$. No interactions were present. Means and standard deviations of reported integrity are shown in Table 11. This result indicates that delegitimisation of the Dodder's integrity in the high conflict condition had not occurred. (See Appendix K for computer printout of results).

Table 11

Mean Scores and Standard Deviations for, How Much do you Think the Dodder is Integrated into its Ecosystem? (possible range 0-9).

	Low integrity			High integrity		
	n	M	SD	n	M	SD
Low conflict	178	5.28	2.46	155	5.28	2.46
High conflict	152	5.26	2.64	152	5.26	2.64

Delegitimisation of Human need

In the same way that delegitimisation of the integrity, ability to feel pain, and the intelligence of Dodder may have occurred, delegitimisation of the human need for the wetland may have also occurred. The human need was objectively the same for all conditions. Therefore, if the reported need of the humans is lower in those conditions where

the Dodder's need is high, this would indicate delegitimisation of the human need. A t-test was conducted to determine whether differences existed in reported human need between high and low conflict groups. Results indicated that delegitimisation of the human need had occurred. The reported human need was significantly lower in the high conflict condition (n = 304, M = 3.98, SD = 2.47), compared to the low conflict condition, (n = 333, M = 4.44, SD = 2.50) ; $t(635) = 2.35$, $p=.019$. (Possible range of scores,- zero to nine with high scores indicating higher need). (See Appendix L for computer printout of results).

Reasons for Allocation: Descriptive frequencies

Responses to the items, I would allocate the wetland to the Marsh Dodder species because.... and, I would allocate the wetland to the Human species because... were coded according to the concepts participants had used in their responses. Responses were coded such that each participant could report a maximum of three concepts. Thus, there were potentially more total responses than there were participants. Responses from two hundred randomly selected participants were examined to elicit common themes from the responses. All of the participants' responses were then coded according to these themes. Inter-rater reliability checks on 100 randomly selected participants found 95% inter-rater agreement on the presence of identified themes.

The qualitative data analysis compared the plant and feeling-thinking-crab conditions because earlier ANOVA analyses showed that significant differences on the dependent variable, Allocate, were present between these conditions. The qualitative data analysis included participants who had been earlier excluded from the analysis due to missing data, or because they were multivariate outliers.

Reasons for allocation

The reasons for allocation to either the Dodder or to the humans varied depending upon what the circumstances of the allocation decision were. For example the reasons for allocation in the low sentience condition are different from the reasons for allocation in the high sentience condition. The influence of sentience, ecosystemic integrity, and conflict on allocation can be understood by comparing the relative frequencies of each reason for allocation, in the high and low conditions. in Tables 12 and 13. Table 12 summarises reasons for allocation to the Dodder, and Table 13 summarises reason for allocation to humans.

Sentience

Generally, where the Dodder was highly sentient (thinking-feeling-crab) the wetland was allocated to the Dodder for reasons of life, diversity/ecosystem, because the Dodder was there first, human responsibility or caretaker and negative characterisations of humans (Table 12), but was allocated to humans for reasons of human superiority (Table 13)

When the Dodder was described as a plant the reasons for allocation to the Dodder were due to reasons of utility to non-humans (Table 12), but allocation to the humans was made for reasons of human need and the unimportance of the Dodder or environment (Table 13).

Ecosystemic integrity

Where the Dodder was highly integrated into its ecosystem allocation of the wetland was made to the Dodder for reasons of life, diversity/ecosystem, human ability to go

elsewhere, and utility for non-humans (Table 12), but was allocated to the humans for reasons of human life (Table 13).

When the Dodder was not highly integrated the reasons for allocation to the Dodder were for reasons of Dodder rarity, and because the wetland was the Dodders' natural home (Table 12).

Conflict

Generally, respondents reported reasons for allocation consistent with experimental manipulations of conflict. Where the Dodder had a high needfor the wetland allocation was made to the Dodder for reasons of life, endangerment, because humans can go elsewhere, rarity and because the Dodder cannot move (Table 12). In the high conflict condition the most frequent reason to allocate to the humans was a direct refusal to allocate (Table 13).

Where the conflict was low an important reason for allocation to the Dodder was due to negative characterisations of humans and because the wetland was the Dodders natural home (Table 12). Where the conflict was low the most important reasons to allocate to the humans was for water or other unspecified need, because humans are superior, or that the Dodder could be relocated or lives in other places.

Negative characterisations of humans, and human ability to go elsewhere were mentioned mostly where the Dodder was highly sentient, or poorly integrated, or where conflict was low.

Overall the most frequently cited reason for allocation to the Dodder was for reasons of life as shown in Table 12. As shown in Table 13, the most cited reason for allocation to humans was for water or other unspecified human need. The second most frequent response was a refusal to allocate to humans.

Table 12

Reasons for Allocation of the Wetland to the Dodder

Reason for allocation	Integrity		Sentience		Conflict	
	Low	High	Low	High	Low	High
Dodder there first	11	7	6	12	8	10
Life	31	39	28	42	27	43
Endangerment	14	10	12	12	3	21
Diversity/ecosystem	13	32	16	29	23	22
Humans go elsewhere	14	27	19	22	12	29
Not interfere nature	4	_	3	1	2	2
Negative human characteristics	7	5	4	8	9	3
Rarity	9	3	6	6	1	11
Equality	4	3	4	3	4	3
Need	6	6	7	5	7	5
Utility for human	3	2	_	5	1	4
Natural home	11	7	1	17	13	5
Important	2	2	3	1	3	1
Cannot move	3	7	3	7	1	9
Would not allocate	4	2	4	2	5	1
Human caretaker	2	5	1	6	2	5
Utility for non-humans	1	12	9	4	6	7
Belongs	2	1	_	3	1	2

Note. Only highest and lowest sentience groups included.

Table 13

Reasons for Allocation of the Wetland to Humans

Reason to allocate to humans	Integrity		Sentience		Conflict	
	Low	High	Low	High	Low	High
Would not allocate	12	21	14	19	9	24
Water/ other need	44	37	49	32	47	34
Life	15	13	17	11	15	13
Human superiority/ more important	12	9	8	13	14	7
I am human	3	1	2	2	1	3
Progress development	3	5	3	5	4	4
Dodder can be relocated/ lives other	17	10	18	9	27	_
Science education	4	_	_	4	4	_
Dodder/ envt. Does not matter	12	1	13	_	8	5
Greed or selfishness	2	2	3	1	1	3

Note. Only highest and lowest sentience groups included.

Discussion

The aim of this research was to investigate the direct and indirect influence of aspects of sentience, ecosystemic integrity, and conflict on the protection of a fictitious non-human entity, (Marsh Dodder) as mediated by the scope of justice. Additionally, the presence of delegitimisation was tested. The results indicate that as the Dodder became more sentient, and more integrated it was more likely to be protected. Where conflict was high, the Dodder was also protected, reflecting the high need of the Dodder for the wetland in the high conflict condition Thus, the presumed intrinsic value bases of sentience and ecosystemic integrity did appear to be associated with higher levels of protection. However, the size of these effects was very small. The scope of justice was unresponsive to experimental manipulations of sentience, ecosystemic integrity, and conflict. The scope of justice was positively correlated with allocation, indicating that as the scope of justice increased so did the extent of allocation. However, this correlation was too small to establish the scope of justice as a mediator variable in the protection decision. Delegitimisation of the Dodder's ability to feel pain did occur, and delegitimisation of the human need for the wetland also occurred, in the high conflict condition. However, delegitimisation of the Dodder's intelligence did not occur, and neither did delegitimisation of the Dodder's ecosystemic integrity.

Sentience

The result for the influence of sentience on the allocation was consistent with the expectation, that where the Dodder was highly sentient, it would be afforded greater protection than when it was not sentient. This result would suggest that perhaps sentience

does exist as an ethical basis for human behaviour towards non-humans. However, the small size of this effect indicates that is not very influential. The apparent weakness of sentience as a basis for allocation is supported by its virtual non-occurrence as a response to the open-ended question, "I would allocate the wetland to the Dodder because..."?. Instead, life appeared to be the most relevant consideration, being the most frequently cited reason for allocation across all experimental conditions. However, since all conditions involved the loss of life (though half involved the potential loss of the entire species life), one would expect equivalence across conditions if a narrow interpretation of life was being used as the decision criteria. However, in the low sentience group (plant), which is still objectively life, the Dodder was not always protected, and certainly received less protection than higher sentience conditions. Thus, life per-se is clearly not the only consideration being made.

The types of reasons that were mentioned varies across sentience groups. This indicates that considerations of sentience do have some influence. The data in this area indicates that participants found a greater number of other reasons for protection when the Dodder was sentient. Clearly then, it is unlikely that life per-se is the relevant criteria, but presumably some aspect of the quality of that life (perhaps sentience, or the magnitude of the life- as in the entire species). In any case participants did not generally report the narrow concept of sentience, but the broader one of life, as a reason for allocation. One possible reason for this may be that people perhaps do not consciously consider the exact nature of the differences between the plant and the crab, and make a global decision, rather than a closely considered decision, during allocation.

A second possible reason for the small influence of sentience may be the possible, relative unimportance of sentience, if it is not the sentience of a human. The difference in

sentience that people may believe exists between a plant and a crab may be so small in comparison to the differences that they perceive between humans and any other being, that the differences between the plant and the crab/s is almost irrelevant.

Perhaps, the simplest explanation however, for the apparent non-contribution of sentience factors is to be drawn from the reasons given for allocation of the wetland to the humans. Where the Dodder's sentience was low, the reasons given for allocation to humans were for reasons of human need, or human life. Where human life was mentioned, responses seemed to refer generally not to life itself, as for the Dodder, but to the quality of life for humans. The ultimate reason for allocation seems clearer in the high sentience condition where the reasons given for allocation of the wetland to humans were simply because of human superiority or importance. The inference here is that due to perceptions of human superiority or importance, the quality of human life is more important than the life per-se of non-human entities. Thus, while aspects of sentience, that may reflect an intrinsic value ethical base, are important, instrumental factors also appear to be important to the extent that the direct effect of sentience on protection is very small.

Ecosystemic Integrity

While aspects of sentience were generally not mentioned as reasons for allocation, ecosystemic integrity, or concepts which suggest this theme were often included in open-ended responses. However, while the frequency of these responses may suggest that considerations of ecosystemic integrity are quite important, the statistical analysis revealed that the influence of ecosystemic integrity on allocation was small. That is, while people may have said that ecosystemic integrity or similar concepts were important, ecosystemic

integrity did not contribute much to the allocation. Further, from the responses given it is unclear whether the responses truly represent an intrinsic-value perspective of ecosystemic integrity, or an instrumental-value perspective

Overall, the results for sentience and ecosystemic integrity appear consistent with a casual observation of what happens in the real world. Ecosystemic integrity and life (interpreted here as sentience) get mentioned often as reasons for protection, but ultimately these considerations do not seem very influential in overall outcomes.

Conflict

Experimental manipulation of the relative needs of the Dodder compared to humans was expected to create a condition of conflict between the Dodder and the humans. According to Opotow (1993) conflict exists where two parties have high and equivalent needs for the same resource. Therefore, high Dodder need (that is- the Dodder lived in only two wetlands) was expected to place the Dodder in conflict with the humans who always needed the wetland. The manipulated level of conflict is realistic in the sense that humans are often in conflict with non-humans in this way, over land or water uses for instance. However, while conflict was present according to this rationale, the threat to humans that participants perceived may have been quite low or even absent.

The main effect that was found for conflict indicated increased allocation to the Dodder where the conflict between the Dodder and the humans was expected to be high. The overarching concern in the presumed conflict conditions may not, therefore, have been the conflict between the humans and the Dodder, but the endangerment of the Dodder. From the qualitative data analysis, endangerment does seem to have been the issue of concern.

The quantitative data indicates that this concern with endangerment results in more protective decisions in every high conflict versus low conflict condition. Thus, the greater allocation in the high conflict condition appears to be due to concerns with endangerment rather than conflict.

Scope of Justice

Scope of justice is reported in the literature to expand and contract in times of conflict. Therefore, the variations in the scope of justice that were expected on the basis of conflict may not have occurred because the salience of the conflict may have been low. However, the Dodder characteristics of sentience and ecosystemic integrity were also expected to influence the scope of justice. Scope of justice appeared unresponsive to experimental manipulations. Scope of justice was positively correlated with allocation, but did not serve as a mediator of aspects of sentience, ecosystemic integrity, or conflict, on allocation of the wetland. These results for the scope of justice were unexpected.

An alternative explanation for the apparent unimportance of scope of justice may be due to the relative size of variations in the scope of justice that are due to experimental manipulations or individual differences. The between subjects experimental design did not control for the effects of individual differences in the scope of justice. Therefore it is possible that individual differences in the scope of justice were greater than differences elicited by experimental manipulations. The individual differences may have outweighed any differences due to experimental manipulations, and these differences in the scope of justice made the very small contribution to the overall allocation.

The ANOVA finding that no significant differences existed between any of the sixteen experimental groups on the scope of justice, combined with the finding that there was a small but significant overall correlation between scope of justice and the dependent variable, Allocate, provides some support for the possible predominance of individual differences.

The dominance of presumed individual differences in the scope of justice may in part be a product of the way that the Scope of Justice was operationalised. Scope of justice referred essentially to the level of belief in the rights of a non-human entity, to the same consideration as would be afforded to humans. The concept of rights however, may reflect a set of general underlying beliefs, rather than a considered response to the experimental situation, even though the scope of justice items generally referred explicitly to the Marsh Dodder. Therefore, the measure of scope of justice that was obtained may not indicate the extent of the scope of justice in the particular experimental situation, but instead it may have indicated underlying individual differences.

The overall outcome that the non-human entity was protected, in what were nonetheless high conflict situations, would suggest that inclusion within the scope of justice had occurred. However, the quantitative data did not support this hypothesis. Thus, the processes that were occurring that resulted in allocation of the wetland to the Dodder do not appear to be related to variations in the scope of justice, that may have been induced by experimental manipulations. Instead, as is indicated by the qualitative data, the simple reason of preservation of life (regardless of the particular motives for preserving the Dodder's life) may be enough to warrant protection directly, without reference to a scope of justice.

Delegitimisation

The delegitimisation literature suggests that delegitimisation occurs where conflict is high. However, again, the salience of the conflict for participants in the current research may not have been high enough to elicit delegitimisation. The conflict did not relate to the participant personally, except by way of their membership of the human species. Additionally, the description of the conflict as occurring in Victoria may have served to further reduce the salience of the personal threat merely by the large physical distance between Perth and Victoria. Indeed, the description of the conflict as occurring in Victoria, and the current sample of Western Australians may have resulted in the allocation of the wetland to the Dodder rather than to the Victorian human, due to the delegitimisation of the need of the Victorian human, rather than the Dodder. Overall however, the threat that forms the basis of subsequent delegitimisation, may not have been salient enough to initiate delegitimisation of all Dodder characteristics.

Delegitimisation towards the Dodder did not occur consistently in the current study. Statistical tests for assessment of delegitimisation were powerful enough to reveal small to moderate effects of delegitimisation. While the reported ability of the Dodder to feel pain in the high conflict condition was lower than in the low conflict condition, thus indicating delegitimisation had occurred, the effect size of sentience was very small. Therefore, even though sentience may be delegitimised a small amount, the influence of sentience on the allocation decision was itself very small anyway. So delegitimisation appears unlikely to be of practical relevance. Delegitimisation of the intelligence and the ecosystemic integrity of the Dodder was not found to have occurred.

While issues in environmental protection can often be stated in terms of threats to the entire non-human species, the threat to the humans from the non-human entity is typically not on the same scale. It is unlikely that humans are really ever seriously threatened in the same way that humans can threaten non-humans Further, issues of environmental protection, particularly in relation to species endangerment, often do occur at large distances from the humans who ultimately decide whether or not to extinguish the non-human individual or species. The current experimental conflict was realistic in this sense, and has found delegitimisation of the Dodder's ability to feel pain, but no delegitimisation of intelligence or ecosystemic integrity. Delegitimisation of ability to feel pain may have contributed to the very small ANOVA effect size for sentience. However, the very small efect size for ecosystemic integrity appears to be independent of any delegitimisation of integrity.

Overall, important processes including variations in the scope of justice and delegitimisation of the Dodder, that were expected to have occurred during the allocation decision have not been consistently evident in the current study. Given the generally strong statistical power of the current analysis, it is likely that the processes that were not found to occur, really are, not occurring, and this may be due largely to the low salience of the conflict. However, the very small direct effect of sentience and ecosystemic-integrity on allocation may also have meant that their effects on the scope of justice were also very small, and perhaps nothing to do with the size of the perceived conflict at all.

Scale

An important issue for this discussion is the issue of scale. The issue of scale relates to the individual scale, the group scale, and the species scale, for both the Dodder and the humans. For example, participants were asked to report how much the Dodder needed the wetland. In all experimental conditions, if the reservoir was built, individual Dodders would die, so the need for the wetland by individual Dodders was very high. However, as a species, the Dodder's need for the wetland may be quite low if it lives in many wetlands. Similarly, ratings of aspects of sentience may be radically different depending upon whether one considers the individual Dodder, which may be quite sentient, or the species as a whole, which is arguably insentient. Additionally, responses to questionnaire items may be quite different depending upon whether one considers the individual human, the township of humans, or the entire human species, to be in conflict with individual Dodders, the particular wetland of Dodders, or the entire Dodder species. Each possible combination of these perspectives could yield potentially very different conceptions of the level of need, the scope of justice and aspects of sentience and ecosystemic integrity. The qualitative data showed that participants have responded from a variety of perspectives, and it is likely that individual participants responded from different (or even several) perspectives for different aspects of the study.

It cannot be known precisely which scale of concern participants used and this is an issue of theoretical concern. Of course, in a real-world sense, an overall or global allocation decision may be made, that may involve the use of several different perspectives or scales of concern, and these will certainly vary from individual to individual. Thus, while the issue of

scale is of theoretical concern, the current experimental approach is entirely acceptable for practical purposes.

Limitations

The generalisability of the current results to the general population is limited. Young people and educated people tend as a group to have more environmentally protective attitudes (Stern, Dietz, & Kalof, 1993). Since the current sample were all university students, mostly aged 18-24 years, it is likely that results are somewhat more generous towards the Dodder than may be expected in the general community. Additionally, different results may be obtained in a real situation that is personally relevant to participants even though many of the participants clearly felt that the issue had personal relevance.

Implications

If the current sample did have more environmentally protective attitudes than the general population, then the already small but positive effects for sentience, ecosystemic-integrity and conflict (need) on protection may disappear completely with a sample from the general population. Even assuming that the results could be generalised to the wider population, a practical implication of the current result, is that arguments for protection of the non-human world that are based on ethical concerns about sentience, or intrinsic value seem unlikely to have practical success. Therefore to argue for the protection of non-human entities on the basis of their presumed intrinsic value would not appear to be worthwhile. The very small influence of the intrinsic value bases may be a useful issue for inclusion in

further philosophical thought, and may promote more realistic or practical applications of models of the ethical bases to behaviour.

Theoretical implications of the current work relate to the presumed level of conflict that must exist before situational scope of justice considerations outweigh individual differences in the scope of Justice. The current result suggests that scope of justice considerations are not particularly influential where humans are in conflict with non-humans. In this case, the role of scope of justice in environmental decisionmaking may not be as relevant as previously thought.

The apparent unimportance of sentience, even though statistically significant, in the current experiment is surprising. The results suggest that sentience is not as important as the literature from legal, medical, animal welfare and philosophical professions suggest. The current findings suggest that human concern for the intrinsic value of non-human entities may not be sufficient reason to change human behaviours that contribute to the current ecological crisis. While the results offer little encouragement for environmentalists, the non-human was protected most of the time. Further, even though the effects of sentience and ecosystemic integrity are small, they may be large enough to tip the balance towards protection.

Future directions

Several issues related to the scope of justice deserve serious attention. First, assuming that situational variations in the scope of justice exist, the rights orientation of the current scale does not appear to have tapped these situational variances. The scale may therefore require redevelopment take account of this suspected shortcoming.

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Appendix A

Standard verbal introduction

Hello, my name is Rob Gulley and I am a student here at Edith Cowan. I am currently doing research for my honours thesis and would like you to take part in the research by completing this questionnaire. The research is about wetlands. It is anonymous, its voluntary and you may withdraw at any time. It will take you about ten minutes to carefully read the information on the front of the first page, and to thoughtfully answer the questions on the front and the back of the second page. The questionnaire is fairly self-explanatory, but here are some definitions if you want them (place overhead transparency slide (Appendix D)). If you have any questions about the research then be sure to ask them during question time after the session. Results of the research will be available in November. My contact details are also on the overhead. For any questions or concerns that you may have later about this research I would encourage you to contact me any time by phone or email. I would certainly appreciate your participation. So I'll hand these out now and you can begin straight away. Thankyou.

Appendix B

Questionnaire introduction and experimental manipulations

This research is about wetlands. Your participation is voluntary. It will take about five minutes of your time to read the information and to answer the questions.

To answer the questions / statements, just circle the answer like this example:

I am sure that I will find this questionnaire interesting

Not at all interesting 0 1 2 3 4 5 6 7 8 9 Very interesting

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The Marsh Dodder Crab now only lives in two wetlands. It needs very special conditions to survive and these conditions would not exist at this wetland if the reservoir is built. In the past, when scientists have tried to relocate the crab to new places the crabs have died. It is vital for the survival of the crab species that the reservoir is not built.

The crabs seem a lot like many "feeling" animals. During laboratory studies, the crabs are found to be very sensitive to pain. They try to run away from a small heater in the side of the tank when it is turned on. When the crabs are put near the heater, they make whistling noises. Shortly after trying to escape from the heat, and making the noises, blood tests show very high levels of pain-reducing chemicals in the crabs' blood.

However, when they are left in the tank with the heater on, the crabs very quickly learn to cover the heater with mud to lower the temperature. Even more surprising is that some crabs will uncover the heater again as the temperature in the tank falls. In the wild, the crabs dig holes to protect themselves, but covering the heater with mud shows a strong learning ability in the new environment.

The Marsh Dodder is a very important member of its ecosystem. Lots of other plants and animals depend upon the Marsh Dodder for their own lives. For some tiny water creatures, the Marsh Dodder is a host. Plants too rely on the Marsh Dodder to help in reproduction. Bigger animals and birds rely on the Marsh Dodder as an essential food source. The Marsh Dodder originally lived in several other places but died when conditions there changed. When the species died, lots of other plants and animals were badly affected because they relied on the Marsh Dodder Crab for their own survival.

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Appendix C

Answer sheet for questionnaire

Note- Font and line spacing reduced for presentation in this document

Let's say that it is up to you to decide whether to use the land for the Marsh Dodder, or for people.

How much will your decision be influenced by....

...considerations of equal access, by humans and the Marsh Dodder species, to all that the earth has to offer?

Not at all 0 1 2 3 4 5 6 7 8 9 Very much

...a belief in equal sacrifice by both humans and the Marsh Dodder species?

Not at all 0 1 2 3 4 5 6 7 8 9 Very much

...a belief in equal rights for the Marsh Dodder species and the humans?

Not at all 0 1 2 3 4 5 6 7 8 9 Very much

...a belief that environmental resources should be allocated so that one species (ie. Humans or Marsh Dodder) does not get more than their fair share?

Not at all 0 1 2 3 4 5 6 7 8 9 Very much

...a belief that each species should have an equal right to use the land for its own purposes?

Not at all 0 1 2 3 4 5 6 7 8 9 Very much

...a belief that when there is a conflict over scarce resources, each of the parties involved should suffer the same amount and type of loss?

Not at all 0 1 2 3 4 5 6 7 8 9 Very much

How much do you think that the Marsh Dodder species can feel pain?

Cannot feel pain at all 0 1 2 3 4 5 6 7 8 9 Can feel pain very much

How much do you think that the Marsh Dodder species is integrated into its ecosystem?

Not at all integrated 0 1 2 3 4 5 6 7 8 9 Very integrated

Do you think that the Marsh Dodder is intelligent?
Not at all intelligent 0 1 2 3 4 5 6 7 8 9 Very intelligent

Please go on to the next page

I would allocate the wetland to the Marsh Dodder species because.....

_____

_____

I would allocate the wetland to the Human species because.....

_____

_____

On balance, how will you allocate the wetland?

Exclusively for the Human species 5 4 3 2 1 0 1 2 3 4 5 Exclusively for the Marsh Dodder species

About me.....

Gender female / male

Age 18-24, 25-31, 32-38, 39-45, 46-52, 53-59, 60+ years old

Years of Education Received

10 or less, 11, 12, 13, 14, 15, 16, 17, 18, 19 +, years of education.

Cultural identity

Australian, Asian, British, European, New Zealand, other (_____) .

Faith

No Faith, Christian, Muslim, Buddhist, other (_____).

Vegetarian

Vegetarian / Non-vegetarian

How much do you think that the Marsh Dodder species needs the wetland?

No need at all 0 1 2 3 4 5 6 7 8 9 Very great need

How much do you think that Humans need the wetland?

No need at all 0 1 2 3 4 5 6 7 8 9 Very great need

Thankyou very much for completing this questionnaire

Appendix D

Overhead transparency- contact details and definition

Enquiries about this research may be directed to:

Rob Gulley: e-mail rgulley@kangeroo.fhhs.ac.cowan.edu.au
phone 9247 1144

Dr. Adelle Hills: Phone 9400 5555
Room 2.212
Edith Cowan University
Joondalup Campus

I will be pleased to answer any questions you have after completion.

Results will be available after November 1, 1997.

Definitions:

Integrated- interdependent, part of a larger whole, interconnected.

Thankyou for your participation

Appendix E

Homogeneity of regression assumptions for the ANCOVA model

Manova

The default error term in MANOVA has been changed from WITHIN CELLS to WITHIN+RESIDUAL. Note that these are the same for all full factorial designs.

* * * * * * A n a l y s i s o f V a r i a n c e * * * * * *

637 cases accepted.
0 cases rejected because of out-of-range factor values.
0 cases rejected because of missing data.
16 non-empty cells.

1 design will be processed.

- -

* * * * * * A n a l y s i s o f V a r i a n c e -- design 1 * * * * * *

Order of Variables for Analysis

Variates	Covariates
ALLOCATE	

1 Dependent Variable
0 Covariates

- -

* * * * * * A n a l y s i s o f V a r i a n c e -- design 1 * * * * * *

Tests of Significance for ALLOCATE using UNIQUE sums of squares

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN+RESIDUAL	4336.16	605	7.17		
SOJT	60.29	1	60.29	8.41	.004
GCONF	30.16	1	30.16	4.21	.041
GINTEG	130.14	1	130.14	18.16	.000
GSENT	33.96	3	11.32	1.58	.193
GCONF * GINTEG	2.55	1	2.55	.36	.551
GCONF * GSENT	13.96	3	4.65	.65	.584
GSENT * GINTEG	9.18	3	3.06	.43	.734
GCONF * GSENT * GINTEG	9.98	3	3.33	.46	.707
SOJT * GCONF + SOJT * GINTEG + SOJT * GSENT + SOJT * GCONF * GINTEG + SOJT * GCONF * GSENT + SOJT * GSENT * GINTEG + SOJT * GCONF * GSENT * GINTEG	126.45	15	8.43	1.18	.286
(Model)	894.65	31	28.86	4.03	.000
(Total)	5230.81	636	8.22		

R-Squared = .171
Adjusted R-Squared = .129

- -

Appendix F

ANOVA- 2 (conflict) x 2 (ecosystemic-integrity) x 4 (sentience) for the dependent variable Scope of Justice

General Linear Model

Between-Subjects Factors

		Value Label
GCONF	1.00	conflict high
	2.00	conflict low
GINTEG	1.00	high integrity
	2.00	low integrity
GSENT	1.00	plant
	2.00	crab
	3.00	feeling crab
	4.00	feeling thinking crab

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
total of sojustice-items q1-q6 added	2.666	15	621	.001

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+GCONF+GINTEG+GSENT+GCONF * GINTEG+GCONF * GSENT+GINTEG * GSENT+GCONF * GINTEG * GSENT

Tests of Between-Subjects Effects

Dependent Variable: total of sojustice- items q1-q6 added

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	1833.048[b]	15	122.203	.983	.471	.023	14.748	.656
Intercept	529994	1	529994	4264.187	.000	.873	4264.187	1.000
GCONF	27.586	1	27.586	.222	.638	.000	.222	.076
GINTEG	134.830	1	134.830	1.085	.298	.002	1.085	.180
GSENT	299.047	3	99.682	.802	.493	.004	2.406	.224
GCONF * GINTEG	27.404	1	27.404	.220	.639	.000	.220	.076
GCONF * GSENT	540.888	3	180.296	1.451	.227	.007	4.352	.385
GINTEG * GSENT	242.161	3	80.720	.649	.584	.003	1.948	.187
GCONF * GINTEG * GSENT	762.020	3	254.007	2.044	.107	.010	6.131	.525
Error	77183.9	621	124.290					
Total	615140	637						
Corrected Total	79016.9	636						

a. Computed using alpha = .05

b. R Squared = .023 (Adjusted R Squared = .000)

Estimated Marginal Means

Grand Mean

Dependent Variable: total of sojustice- items q1-q6 added

Mean	Std. Error
29.06	.445

GCONF

Dependent Variable: total of sojustice- items q1-q6 added

GCONF	Mean	Std. Error
conflict high	29.27	.643
conflict low	28.85	.616

GINTEG

Dependent Variable: total of sojustice- items q1-q6 added

GINTEG	Mean	Std. Error
high integrity	29.53	.619
low integrity	28.60	.640

GSENT

Dependent Variable: total of sojustice- items q1-q6 added

GSENT	Mean	Std. Error
plant	28.95	.874
crab	28.00	.912
feeling crab	29.44	.922
feeling thinking crab	29.86	.850

Multiple Comparisons

Dependent Variable: total of sojustice- items q1-q6 added

	(I) GSENT	(J) GSENT	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	plant	crab	.89	1.260	.896	-2.35	4.12
		feeling crab	-.46	1.266	.983	-3.72	2.79
		feeling thinking crab	-.61	1.210	.959	-3.71	2.50
	crab	plant	-.89	1.260	.896	-4.12	2.35
		feeling crab	-1.35	1.294	.725	-4.67	1.98
		feeling thinking crab	-1.49	1.239	.625	-4.67	1.69
	feeling crab	plant	.46	1.266	.983	-2.79	3.72
		crab	1.35	1.294	.725	-1.98	4.67
		feeling thinking crab	-.14	1.246	.999	-3.34	3.06
	feeling thinking crab	plant	.61	1.210	.959	-2.50	3.71
		crab	1.49	1.239	.625	-1.69	4.67
		feeling crab	.14	1.246	.999	-3.06	3.34
Tamhane	plant	crab	.89	1.260	.985	-2.62	4.39
		feeling crab	-.46	1.266	.999	-3.81	2.89
		feeling thinking crab	-.61	1.210	.996	-3.72	2.51
	crab	plant	-.89	1.260	.985	-4.39	2.62
		feeling crab	-1.35	1.294	.897	-4.90	2.20
		feeling thinking crab	-1.49	1.239	.801	-4.82	1.84
	feeling crab	plant	.46	1.266	.999	-2.89	3.81
		crab	1.35	1.294	.897	-2.20	4.90
		feeling thinking crab	-.14	1.246	1.000	-3.30	3.02
	feeling thinking crab	plant	.61	1.210	.996	-2.51	3.72
		crab	1.49	1.239	.801	-1.84	4.82
		feeling crab	.14	1.246	1.000	-3.02	3.30

Homogeneous Subsets

total of sojustice- items q1-q6 added

	GSENT	N	Subset 1
Tukey HSD[a,b]	crab	150	28.06
	plant	164	28.95
	feeling crab	147	29.41
	feeling thinking crab	176	29.55
	Sig.		.633

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares

a. Uses Harmonic Mean Sample Size = 158.424.

b. Alpha = .05.

Appendix G

ANOVA- 2 (conflict) x 2 (ecosystemic-integrity) x 4 (sentience) for the dependent variable Allocate

General Linear Model

Between-Subjects Factors

		Value Label
GCONF	1.00	conflict high
	2.00	conflict low
GINTEG	1.00	high integrity
	2.00	low integrity
GSENT	1.00	plant
	2.00	crab
	3.00	feeling crab
	4.00	feeling thinking crab

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
ALLOCATE	.930	15	621	.530

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+GCONF+GINTEG+GSENT+GCONF * GINTEG+GCONF * GSENT+GINTEG * GSENT+GCONF * GINTEG * GSENT

Tests of Between-Subjects Effects

Dependent Variable: ALLOCATE

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	672.416[b]	15	44.828	6.107	.000	.129	91.605	1.000
Intercept	359.998	1	359.998	49.043	.000	.073	49.043	1.000
GCONF	259.133	1	259.133	35.302	.000	.054	35.302	1.000
GINTEG	244.457	1	244.457	33.303	.000	.051	33.303	1.000
GSENT	106.429	3	35.476	4.833	.002	.023	14.499	.905
GCONF * GINTEG	.156	1	.156	.021	.884	.000	.021	.052
GCONF * GSENT	25.724	3	8.575	1.168	.321	.006	3.504	.315
GINTEG * GSENT	42.222	3	14.074	1.917	.126	.009	5.752	.497
GCONF * GINTEG * GSENT	7.287	3	2.429	.331	.803	.002	.993	.115
Error	4558.394	621	7.340					
Total	5591.000	637						
Corrected Total	5230.810	636						

a. Computed using alpha = .05

b. R Squared = .129 (Adjusted R Squared = .107)

Estimated Marginal Means

Grand Mean

Dependent Variable: ALLOCATE

Mean	Std. Error
.76	.108

GCONF

Dependent Variable: ALLOCATE

GCONF	Mean	Std. Error
conflict high	1.40	.156
conflict low	.11	.150

GINTEG

Dependent Variable: ALLOCATE

GINTEG	Mean	Std. Error
high integrity	1.38	.150
low integrity	.13	.156

GSENT

Dependent Variable: ALLOCATE

GSENT	Mean	Std. Error
plant	.15	.212
crab	.96	.222
feeling crab	.69	.224
feeling thinking crab	1.23	.207

Appendix H

ANCOVA- 2 (conflict) x 2 (ecosystemic-integrity) x 4 (sentience) for the dependent variable Allocate, with Scope of justice as covariate

General Linear Model

Between-Subjects Factors

		Value Label
GCONF	1.00	conflict high
	2.00	conflict low
GINTEG	1.00	high integrity
	2.00	low integrity
GSENT	1.00	plant
	2.00	crab
	3.00	feeling crab
	4.00	feeling thinking crab

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
ALLOCATE	.943	15	621	.515

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+SOJT+GCONF+GINTEG+GSENT+GCONF * GINTEG+GCONF * GSENT+GINTEG * GSENT+GCONF * GINTEG * GSENT

Tests of Between-Subjects Effects

Dependent Variable: ALLOCATE

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	768.203[b]	16	48.013	6.671	.000	.147	106.728	1.000
Intercept	5.660	1	5.660	.786	.376	.001	.786	.144
SOJT	95.787	1	95.787	13.308	.000	.021	13.308	.954
GCONF	253.120	1	253.120	35.167	.000	.054	35.167	1.000
GINTEG	231.428	1	231.428	32.153	.000	.049	32.153	1.000
GSENT	104.033	3	34.678	4.818	.003	.023	14.453	.904
GCONF * GINTEG	4.4E-02	1	4.4E-02	.006	.937	.000	.006	.051
GCONF * GSENT	22.336	3	7.445	1.034	.377	.005	3.103	.282
GINTEG * GSENT	36.258	3	12.086	1.679	.170	.008	5.037	.441
GCONF * GINTEG * GSENT	7.250	3	2.417	.336	.800	.002	1.007	.116
Error	4462.607	620	7.198					
Total	5591.000	637						
Corrected Total	5230.810	636						

a. Computed using alpha = .05

b. R Squared = .147 (Adjusted R Squared = .125)

Estimated Marginal Means

Grand Mean

Dependent Variable: ALLOCATE

Mean	Std. Error
.76	.107

GCONF

Dependent Variable: ALLOCATE

GCONF	Mean	Std. Error
conflict high	1.39	.155
conflict low	.12	.148

GINTEG

Dependent Variable: ALLOCATE

GINTEG	Mean	Std. Error
high integrity	1.36	.149
low integrity	.15	.154

GSENT

Dependent Variable: ALLOCATE

GSENT	Mean	Std. Error
plant	.15	.210
crab	1.00	.220
feeling crab	.68	.222
feeling thinking crab	1.20	.205

Appendix I

ANOVA- 4 (sentience) x 2 (conflict) for the dependent variable, reported intelligence of the Dodder

General Linear Model

Between-Subjects Factors

		Value Label
GSENT	1.00	plant
	2.00	crab
	3.00	feeling crab
	4.00	feeling thinking crab
GCONF	1.00	conflict high
	2.00	conflict low

Tests of Between-Subjects Effects

Dependent Variable: is the Dodder intelligent

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power[a]
Corrected Model	1030.613[b]	7	147.230	26.116	.000	182.810	1.000
Intercept	12313.2	1	12313.2	2184.105	.000	2184.105	1.000
GSENT	1007.766	3	335.922	59.586	.000	178.757	1.000
GCONF	2.544	1	2.544	.451	.502	.451	.103
GSENT * GCONF	24.002	3	8.001	1.419	.236	4.258	.378
Error	3546.062	629	5.638				
Total	17114.0	637					
Corrected Total	4576.675	636					

a. Computed using alpha = .05

b. R Squared = .225 (Adjusted R Squared = .217)

Estimated Marginal Means

Grand Mean

Dependent Variable: is the Dodder intelligent

Mean	Std. Error
4.42	.094

GSENT

Dependent Variable: is the Dodder intelligent

GSENT	Mean	Std. Error
plant	2.63	.185
crab	4.16	.194
feeling crab	4.86	.196
feeling thinking crab	6.02	.180

GCONF

Dependent Variable: is the Dodder intelligent

GCONF	Mean	Std. Error
conflict high	4.35	.136
conflict low	4.48	.131

Appendix J

ANOVA- 4 (sentience) x 2 (conflict) for the dependent variable, reported ability of Dodder to feel pain

General Linear Model

Warnings

The DESIGN subcommand is empty, so a saturated design will be generated.

Between-Subjects Factors

		Value Label
GCONF	1.00	conflict high
	2.00	conflict low
GSENT	1.00	plant
	2.00	crab
	3.00	feeling crab
	4.00	feeling thinking crab

Tests of Between-Subjects Effects

Dependent Variable: can the Dodder feel pain

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power[a]
Corrected Model	1710.296[b]	7	244.328	43.734	.000	306.140	1.000
Intercept	21713.0	1	21713.0	3886.582	.000	3886.582	1.000
GCONF	28.356	1	28.356	5.076	.025	5.076	.614
GSENT	1654.646	3	551.549	98.726	.000	296.178	1.000
GCONF * GSENT	31.265	3	10.422	1.865	.134	5.596	.485
Error	3514.006	629	5.587				
Total	26972.0	637					
Corrected Total	5224.301	636					

a. Computed using alpha = .05

b. R Squared = .327 (Adjusted R Squared = .320)

Estimated Marginal Means

Grand Mean

Dependent Variable: can the Dodder feel pain

Mean	Std. Error
5.86	.094

GCONF

Dependent Variable: can the Dodder feel pain

GCONF	Mean	Std. Error
conflict high	5.65	.136
conflict low	6.08	.130

GSENT

Dependent Variable: can the Dodder feel pain

GSENT	Mean	Std. Error
plant	3.16	.185
crab	6.22	.193
feeling crab	7.11	.195
feeling thinking crab	6.96	.179

Appendix K

ANOVA- 2 (ecosystemic integrity) x 2 (conflict) for the dependent variable, integrity of Dodder

General Linear Model

Between-Subjects Factors

		Value Label
GCONF	1.00	conflict high
	2.00	conflict low
GINTEG	1.00	high integrity
	2.00	low integrity

Levene's Test of Equality of Error Variances[a]

	F	df1	df2	Sig.
is the Dodder integrated	27.932	3	633	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept+GCONF+GINTEG+GCONF * GINTEG

Tests of Between-Subjects Effects

Dependent Variable: is the Dodder integrated

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta Squared	Noncent. Parameter	Observed Power[a]
Corrected Model	809.820[b]	3	269.940	60.268	.000	.222	180.803	1.000
Intercept	26006.3	1	26006.3	5806.239	.000	.902	5806.239	1.000
GCONF	.734	1	.734	.164	.686	.000	.164	.069
GINTEG	809.800	1	809.800	180.798	.000	.222	180.798	1.000
GCONF * GINTEG	1.249	1	1.249	.279	.598	.000	.279	.082
Error	2835.222	633	4.479					
Total	30073.0	637						
Corrected Total	3645.042	636						

a. Computed using alpha = .05

b. R Squared = .222 (Adjusted R Squared = .218)

Estimated Marginal Means

Grand Mean

Dependent Variable: is the Dodder integrated

Mean	Std. Error
6.40	.084

GCONF

Dependent Variable: is the Dodder integrated

GCONF	Mean	Std. Error
conflict high	6.44	.121
conflict low	6.37	.116

GINTEG

Dependent Variable: is the Dodder integrated

GINTEG	Mean	Std. Error
high integrity	7.53	.117
low integrity	5.27	.121

Appendix L

T-test for equality of means of human need in high and low conflict conditions

T-Test

Group Statistics

	GCONF	N	Mean	Std. Deviation	Std. Error Mean
need of Humans	conflict high	304	3.98	2.47	.14
	conflict low	333	4.44	2.50	.14

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confide nce Lower
need of Humans	Equal variances assumed	.194	.660	-2.352	635	.019	-.46	.20	-.85
	Equal variances not assumed			-2.354	631.129	.019	-.46	.20	-.85

Independent Samples Test

		t-test for Equality of Means	
		95% Confide nce Upper	
need of Humans	Equal variances assumed	-7.7E-02	
	Equal variances not assumed	-7.7E-02	