Do financial incentives motivate conservation on private land?

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Supplementary material 1 Description of conservation programmes.

Covenants Conservation covenants are a formalized agreement between a landholder and the government (in Australia) that will set environmental restrictions on what activities are or are not permitted within a private land. Covenants are written into the land title and thus conserve native habitat for perpetuity (even after the land is sold). In Tasmania, conservation covenants were established in a number of different programmes. Some of the programmes provided little or no financial incentives for covenanting (eg. Protected Areas on Private Land), whereas other covenant programmes (eg. Forest Conservation Fund) provided substantial incentives (Iftekhar et al., 2014). In addition, some landowners benefited from ongoing support for costs of upkeep of the conservation values on their properties as well as tax rebates. In addition to these financial benefits, another key benefit from covenanting is the opportunity to interact and learn from stewardship officers who provide advice about the land.

Stewardship programmes In addition to covenant programmes there are also a series of different types of stewardship programmes that provide smaller sums of money from government or non-governmental organization or expertise to help landowners fence off waterways or restore native vegetation (Sharp & Curtis, 2014). These are often short-term projects in which landowners need to demonstrate they have used the money for the stated purposes. Programmes such as Natural Resource Management fencing or weeding programmes, Landcare, or Greening Australia grants helped provide volunteers or small financial compensations for these projects on private land. Although funds from Natural Resource Management and Greening Australia tended to target individuals, Landcare provided funds largely for community groups (Curtis & Lockwood, 2000; Prager & Vanclay, 2010). Included in these types of programmes is the Midlands Conservation Fund, that provide land owners with longer-term, up to 10 year, support for stewardship projects on private land. Similar to Greening Australia, this programme focuses on the Midlands because of the high diversity and threat in the area.

Strictly educational programmes—Land for Wildlife and Gardens for Wildlife In addition to the covenants and stewardship programmes that tend to provide some financial incentives, there were also two programmes Land for Wildlife (for >2 ha properties) or Gardens for Wildlife (<2 ha properties) established by the state governments that provide only educational materials and signs that are posted on the properties. Moreover, unlike some of the initiatives above that require specific types of ecological attributes on the land for the assessment process, these programmes were more about the commitment of the landowner to try to improve habitat. Although there is an initial assessment process for Land for Wildlife (there is no initial assessment for Gardens for Wildlife), in which a programme officer usually visits the property,

habitats in a wide range of conditions may qualify to become part of wildlife and the focus of the assessment is driven more by the level of commitment of the landowner to conservation. Unlike a covenant, the agreement between the landowner and the government is voluntary, there are no penalties for breaking the agreement, there are no assessments or monitoring after the initial assessment and the Land/Gardens for Wildlife designation does not carry over to future land owners when the land is sold. Unlike the other two programmes that provide financial incentives, both of these programmes aim to enhance environmental management through shifting or activating the identities of landowners towards a conservation rather than directly mandating changes on the land (McDonald, 2001; McGuire et al., 2013).

SUPPLEMENTARY MATERIAL 2 Survey questions to assess landowner's experiences of and motivations for participating in private land conservation programmes.

Autonomy-supportive environments

These items were adapted from previous research on autonomy-supportive environments in education, work and a coaching (Black & Deci, 2000; Pelletier et al., 2001; Baard et al., 2004).

Please answer the below questions related to your experiences with the Programme using the following scale:

1	2	3	4	5	6	7
Strongly disagree	Mostly disagree	Disagree somewhat	Neutral	Agree somewhat	Mostly agree	Strongly agree

1. The Programme Officer answers my questions fully and carefully.
2. The Programme pressures me to change my land management goals.
3. The Programme Officer tries to understand how I see things before suggesting a course of action.

Autonomy
Questions for both autonomy and competence were adapted from the autonomy-sub-scale of the basic psychological needs questionnaire (Deci et al., 2001).

When I engage in this Programme…

1. I feel pressured.
2. I feel a sense of choice and freedom in the tasks I undertake.
3. I feel burdened by my conservation obligation.
4. I feel that my decisions reflect what I really want.

Competence
When I engage in this Programme…

1. Often, I do not feel competent.
2. I feel a sense of accomplishment from what I do.
3. I have been able to learn interesting new skills.
4. I feel competent to achieve my goals.

Autonomous and non-autonomous motivations

Table 1. These items were adapted from the Motivation Towards the Environment Scale (Pelletier et al., 1998). These 6 items refer to different types of motivations that range from autonomous and intrinsically motivated (coming from within and for the inherent pleasure) to much less autonomous and externally motivated forms of regulation. Detailed descriptions of the scale, the validity and reliability are published elsewhere (Pelletier et al., 1998; Cooke et al., 2016). Three items were aggregated to create a measure of autonomous motivation (AM) by (3 x Intrinsic + 2 x Integrated + Identified) while three items were combined to create a measure of non-autonomous motivation (NAM) (3 x Amotivation + 2 x External + Introjection).

Instruction: Using the scale below, indicate to what extent each of the following items correspond to one of the reasons why you decided to engage in the Programme on your land

I participate in the Programme…

1	2	3	4	5	6	7
Does not correspond at all	Corresponds slightly		Corresponds moderately		Corresponds a lot	Corresponds exactly

I participate in the Programme…..	Incentives N = 29	No incentives N = 144
Autonomous Motivation		
Intrinsic – for the pleasure in mastering new skills	2.8[0.3]	3.6[0.01]
Integrated – because it is part of the way I've chosen to live my life	6.0[0.2]	6.3[0.01]
Identified – because it is a sensible thing to do given the state of the environment	5.9[0.3]	6.0[0.01]
Non-Autonomous motivation		
Introjection – because I would feel guilty if I didn't	3.1[0.4]	2.9[0.01]
External – for the recognition that I get from my neighbours	1.8[0.2]	1.9[0.01]
Amotivation – I don't know why I engage. I think I am wasting my time.	1.4[0.2]	1.5[0.01]

S<small>UPPLEMENTARY MATERIAL</small> 3 Correlations amongst demographic characteristics, motivations and values.

The correlation matrix (Supplementary Table 2) indicates relationships between values, motivations and behaviour demonstrated patterns that were consistent with past empirical research and theoretical predictions of Self-Determination Theory (Ryan & Deci, 2017) and the Theory of Basic Values (Schwartz et al., 2012). For example older people tended to be more conservative and less self-enhancing, people who perceived programmes to be more autonomy-supportive, felt more competent and autonomous when carrying out conservation tasks (Schwartz et al., 2012; Baur et al., 2016). Furthermore, more self-transcendent people were less self-enhancing and had motivations that were more autonomously and less controlled, whereas the reverse was true for more self-enhancing participants. Finally the people who reported engaging in more conservation actions or hours tended to be more autonomously motivated and also felt more competent when engaging in conservation.

S<small>UPPLEMENTARY</small> T<small>ABLE</small> 2 Spearman's correlation coefficients of demographic variables, feelings of autonomy and competence in the programmes, values (self-transcendent, self-enhancement, conservative, open-to-change), motivation type (autonomous and non-autonomous) and self-reported conservation behaviours (number of management actions and hours of engagement).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	1.00													
2. Year property purchased	-0.44**	1.00												
3. Property size (ha)	0.02	-0.15*	1.00											
4. Autonomy-support	-0.09	0.16*	0.01	1.00										
5. Autonomy	-0.02	0.11	-0.04	0.35**	1.00									
6. Competence	-0.01	0.03	-0.02	0.38**	0.53**	1.00								
7. Don't need programme	-0.06	-0.01	-0.17*	-0.26**	0.00	-0.03	1.00							
8. Self-transcendence	0.14	0.00	-0.05	0.17*	0.19*	0.13	-0.11	1.00						
9. Self-enhancement	-0.18*	0.05	0.00	-0.15*	-0.14	-0.10	0.00	-0.51**	1.00					
10. Conservativism	0.21**	-0.25**	0.04	-0.07	-0.01	-0.01	0.09	-0.44**	-0.25**	1.00				
11. Openness to change	-0.10	0.15*	-0.01	0.00	-0.01	0.03	0.00	0.19**	-0.22**	-0.43**	1.00			
12. Autonomous motive	0.11	0.01	-0.02	0.08	0.28**	0.23**	-0.05	0.16*	-0.20**	0.02	0.09	1.00		
13. Non-autonomous motive	0.01	-0.17*	0.08	-0.14	-0.24**	-0.12	0.07	-0.26**	0.22**	0.03	0.01	0.06	1.00	
14. No. management actions	-0.05	-0.05	0.08	-0.09	0.06	0.12	0.11	-0.06	0.05	0.04	-0.04	0.20*	0.08	1.00
15. Hours	-0.12	0.09	-0.06	0.06	0.02	0.15*	-0.03	0.00	-0.07	0.02	0.00	0.08	0.04	0.12

*P < 0.05, **P < 0.01.

S UPPLEMENTARY MATERIAL 4 Descriptive figures (Supplementary Figs 1 & 2) of the values and motivation towards the environment. Individual component scores are indicated. Values and motivations were aggregated for analysis.
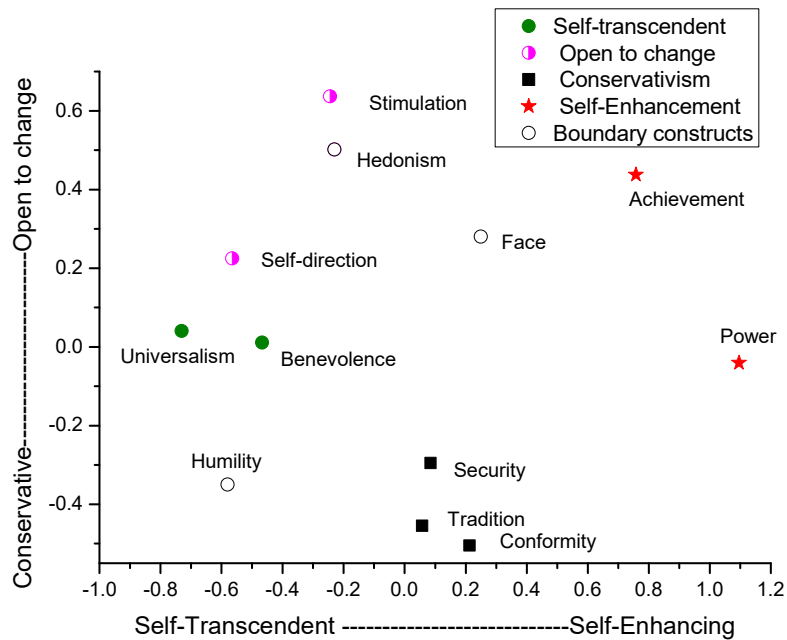
S UPPLEMENTARY F IG . 1 Proxscal, multi-dimensional scaling plots from the 21 items of the Portrait Values Questionnaire. Dimension 1 represents self-transcendence to self-enhancement while dimension 2 represents conservativism versus openness to change. 'Boundary constructs' refers to those items that are on the boundaries of the four higher-order constructs. Aside from a slightly different location for Face (it should be between power and conservativism, and instead it is closer to hedonism), the values were structured similar to theoretical predications based on the Theory of Basic Values (Schwartz et al. 2012).
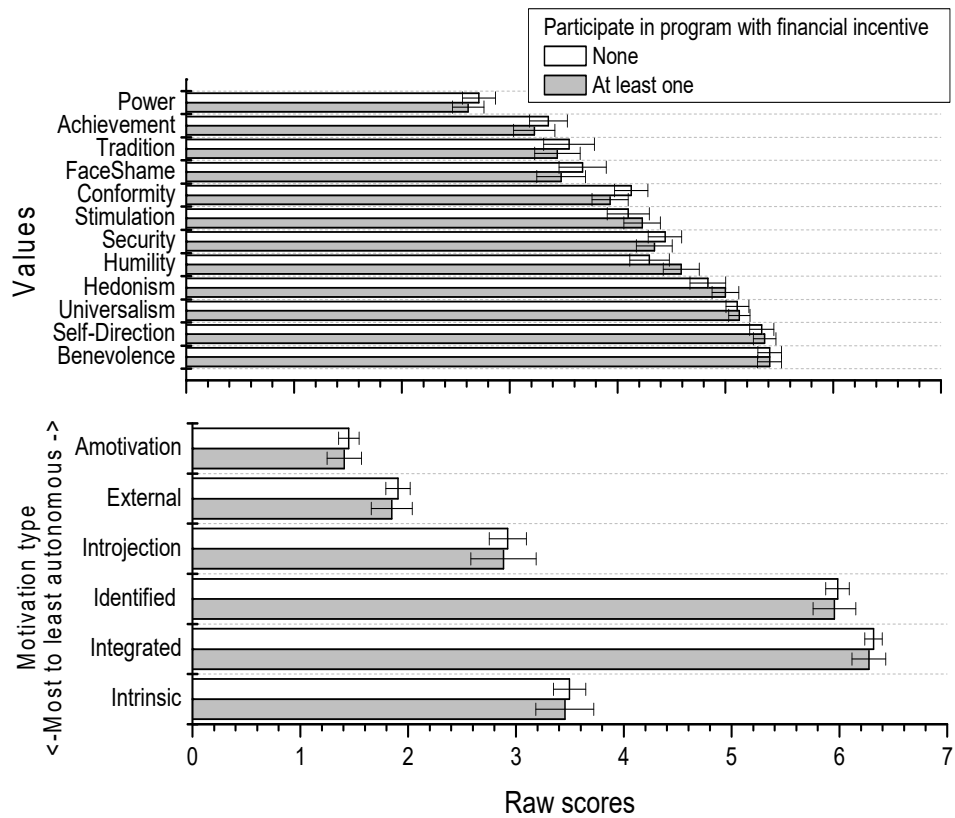
SUPPLEMENTARY FIG. 2 Values from the PVQ (top) and motivation type from the Motivation Towards the Environment Scale (bottom) of people who engaged in conservation programmes with and without financial incentives. Bars represent mean raw scores and standard errors are depicted.

SUPPLEMENTARY MATERIAL 5 Preliminary exploratory multivariate analysis. Alternative method of analysis that indicated the same results.

In addition to this univariate comparison, as a preliminary analysis we also conducted exploratory multivariate analysis to examine whether there were any groupings of participants based on demographic or property characteristics, programme type, values, motivations and management actions (Kirkpatrick et al. 2007). To do this we used hierarchical cluster analysis in *SPSS*, using Euclidian distances and Ward Linkages. Based on an examination of the dendrogram, we created four groups, and then we examined differences in both continuous and categorical data across the four groups of participants. Kruskall-Wallis test and for the categorical data we conducted a Pearson's chi-squared test. Though this multivariate analysis indicated that weak groupings could be created based on values and attitudes, there was also no indication that people who participate in incentivised programmes were different in terms of demographic characteristics, values, motivations or behaviours.