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**Will One Size Fit All? Incentives
Designed to Nurture Prosocial Behaviour ***

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Highlights

- This paper highlights the role of environmental morale on recycling activities.
- A ‘nudge’ *versus* a ‘shove’ policy is evaluated using questionnaire data.
- Both policies are in general effective in increasing recycling activities.
- A policy choice conditioned upon environmental morale is superior.
- A nudge is more effective at high levels of environmental morale.

Will One Size Fit All? Incentives

Designed to Nurture Prosocial Behaviour

Abstract

Gneezy et al. (2011) review a literature that assesses the relevance of the form (monetary or non-monetary) of incentives employed to nurture prosocial behaviour. Here the objective is to assess the relevance of characteristics employed to describe individuals when comparing the efficacy of incentives designed to nurture prosocial behaviour. The impact of different incentives depends on the form they take *and* on the way they are received. This paper compares the impact of different incentives designed to increase pro-environmental behavior (by increasing individuals' willingness to recycle household waste). Some individuals are more responsive to a nudge (that increases individuals' perceptions of the intrinsic value of action) than to a threat (that they will be punished if they refuse to comply). The relative efficacy of these incentives depends on the extent to which individuals are motivated by 'environmental morale'. When designing policy to increase prosocial behavior, 'one size will not fit all'.

Keywords: *nudging*, environmental morale, crowding-in, crowding-out, recycling.

JEL Classification: H3, H39

1. Introduction

Gneezy et al. (2011, p. 206) examine “...when and why incentives...work to modify behaviour”. They conclude that “... the effect of incentives depends on how they are designed, the form in which they are given (especially monetary or non-monetary), how they interact with intrinsic motivation and social motivation and what happens after they are withdrawn”. In this paper the objective is to explore the efficacy of different incentives with reference to characteristics that can be employed to describe ‘representative individuals’.

Gneezy et al. (ibid, p. 199) survey the literature that assesses the impact of incentives with reference to their impact on “...voluntary contributions to public goods, such as donating blood, volunteering or protecting the environment.” Here the intention is to compare the impact of incentives with reference to individuals’ willingness to protect the environment. This paper compares the efficacy of incentives designed to increase individuals’ willingness to recycle household waste.

Neoclassical economics explores the impact that incentives exert on relative prices. This approach often focuses on monetary incentives (monetary rewards, or monetary punishments). The impact of an incentive depends on the extent to which it alters the relative price of achieving an outcome. By comparison, behavioural economics insists that individuals are motivated by the value of outcomes (contingent on action) *and* by the intrinsic value of action. As an example, Andreoni (1990) refers to the ‘warm glow’ that individuals derive from the *act* of giving to charities.

Thaler and Sunstein (2008) draw on insights from behavioural economics to argue that individuals can be ‘nudged’ to act more prosocially (e.g. they show that policy can be designed to increase the supply of human organs for transplant operations). In this paper the objective is to question whether individuals can be nudged to increase their willingness to recycle household waste by changing their perceptions of the intrinsic value of pro-environmental action. The paper is organized as follows:

Section two considers the relevance of intrinsic motivation. Are individuals more like instrumental *homo economicus*, or are they also motivated by environmental morale? If ‘tax morale’

is relevant when explaining individuals' willingness to pay taxes (e.g., Torgler, 2005), is 'environmental morale' relevant when explaining individuals' willingness to protect the environment?

Section three of the paper focuses on the impact of incentives. If incentives are able to change perceptions of the intrinsic value of action, how will they change individuals' perceptions of the intrinsic value of recycling household waste? Is it possible to 'nudge'? Is it possible to increase perceptions of the intrinsic value of recycling household waste? If so, will a nudge prove more effective than a coercive intervention? For Thaler and Sunstein (2008) a nudge is an example of 'paternal libertarianism'. While the intention is to change behaviour, individuals must always remain free to choose how they will behave. In this study the impact exerted by a nudge is compared to the impact that is exerted when the government threatens to fine individuals if they do not recycle household waste. This coercive intervention is more of a 'shove' than a 'nudge'. Results from this analysis suggest that, on first comparison, the nudge and the shove appear equally effective. There is *policy invariance*. However, the nudge appears to be more effective than the shove the more that individuals are motivated by the intrinsic value of action.

With evidence that the impact of incentives depends on descriptions of 'representative individuals', section four of the paper considers the difficulties that policymakers will encounter if they decide to 'tailor' incentives to different descriptions of 'representative individuals'. The results in the early section of the paper suggest that policymakers can achieve more if they rely on a set of bespoke incentives. This section illustrates the costs that they are likely to encounter.

In the racing fraternity it is common knowledge that there are '...different horses for different courses' (the likelihood that a horse will win a race depends on the characteristics of the racecourse). In just the same way, the performance of an incentive depends on the characteristics of 'representative individuals' of the targeted group. The impact of incentives (monetary or non-monetary) depends on the way that they are received. One size will not fit all!

2. The Description of the ‘Representative Individual’

Neoclassical economics focuses on the behaviour of *homo economicus*. *Homo economicus* has been described as: rational; egoistic; with egoism predicated on self-interest, narrowly defined in terms of income or wealth (Brennan and Lomasky, 1993). *Homo economicus* responds to ‘economic’ (or ‘extrinsic’) incentives – taxes, subsidies, fines, mandatory policy, etc. Analysts focus on the way that changes in incentives change constraints. Predictions are premised on the assumption that preferences are exogenous and constant (Stigler and Becker, 1977).

More recently, behavioural economics has been identified as a different ‘representative individual’ (*homo behavioural economicus*). This actor might rely on: bounded rationality; bounded self-will; bounded self-interest (see Mullainathan and Thaler, 2000). However in this paper, the important difference is that the ‘representative individual’ derives value from outcomes contingent on action *and* also intrinsic value from action itself. Individuals are described as “...intrinsically motivated to perform an activity when one receives no apparent reward except the activity itself...” (Deci, 1971, p. 105)¹.

Perceptions of the intrinsic value of action depend on moral considerations and on low-cost signals that acknowledge action (e.g., Deci and Ryan, 1985). In this context, behaviour depends on the low-cost signals that are emitted when governments introduce and administer public policies (e.g., Frey, 1997). Here the objective is to assess: (i) the extent to which the relevance of intrinsic motivation differs across different individuals, and (ii) the extent to which intrinsic motivation is relevant when predicting willingness to recycle household waste.

A literature in environmental economics has already explored the importance of intrinsic motivation, e.g. De Young (1996) refers to the personal contentment that individuals derive from pro-environmental behaviour. A literature also explores the importance of intrinsic motivation when explaining willingness to recycle household waste. Brekke et al. (2003), Kinnaman (2006) and Abbott et al. (2013) conclude that individuals experience a ‘warm glow’ when recycling household waste.

¹ It seems that the dopamine system in the brain will reward you for ‘doing the right thing’, so the lack of reward may be more apparent than real (leaving the possibility of truly selfless acts in doubt).

However, here the objective is to focus on differences in the impact that different incentives exert. In order to explore these differences, a questionnaire was designed and distributed to students at the Universities of Bath (United Kingdom) and Florence (Italy). Data were collected from students enrolled on economics and psychology taught course units (the overwhelming majority of respondents were registered in the economics and psychology departments). The choice of academic disciplines reflects a literature on economists being ‘different’ and less likely to contribute to the common goods (see, for example, Cipriani et al., 2009). During a brief introduction to the study, participants were instructed that the survey was anonymous and there were no right or wrong answers. After receiving a printed version of the questionnaire, students were asked to complete the survey on their own and without consulting their colleagues. The time taken to hand out the questionnaires, to complete them and to collect them again was approximately 20 minutes. In all, 1,190 responses were collected.²

One of the important questions is whether the extent to which the ‘representative individual’ for this cohort is motivated by ‘environmental morale’. In the questionnaire survey ‘environmental morale’ was inferred from the responses to a set of questions (multi-item index – Cronbach’s Alpha = 0.61) where individuals were asked to indicate how often (from 1 = never, to 5 = always) they take specific ‘green’ actions (such as save water, recycle³, turn off lights, and walk, cycle or take public transport) for environmental reasons⁴. Responses to the items were aggregated to form an index ranging from 4 to 20. This measure of environmental morale is important when analysing the relevance of the intrinsic value (or ‘warm glow’) that individuals derive from action that is pro-environmental⁵.

² Data from 25 participants were excluded. Among them, 10 did not complete the questionnaire, 8 answered all questions without following the instructions (next to each option), and the remaining 7 provided answers that were not consistent with the structure of the questionnaire. This provides evidence in support of the conclusion that, generally, respondents understood the questionnaire.

³ The inclusion of this item into the index measurement increases the reliability of the index (i.e., Cronbach’s Alpha increases from 0.54 to 0.61). While it might appear circular to include this item, all of the tests reported below remain robust when this item is excluded from the index measurement.

⁴ Berglund (2006) uses a similar approach to build a green moral index (GMI). Note that in its original formulation, the index included a question about individuals’ willingness to buy a ‘green’ product rather than a conventional identical good (see Barile, 2012). However, both the estimated Cronbach’s Alpha when deleting the item and the corrected item-total correlation suggested removing this item from the index measurement.

⁵ Torgler (2005) uses a similar definition of ‘tax morale’.

If environmental morale differs systematically across individuals, how important is environmental morale when predicting individuals' willingness to recycle household waste? Willingness to recycle was inferred by asking respondents to assess their level of contribution in terms of effort spent on recycling activities given the assumption that they had to bear the time and trouble costs of recycling activities (e.g., separate their waste and/or buy different bins and garbage bags for specific waste). In this setting (hereafter BENCHMARK/COUNTERFACTUAL scenario), responses were based on a five-point Likert scale (from 1 = I will do hardly any recycling, to 5 = very high)⁶. Using ordered probit, the following relationship was estimated:

$$dep_i = \beta_0 + \beta_1 sociodem_i + \beta_2 attitudes_i + \beta_3 ethics_i + \varepsilon_i, \quad (1)$$

where dep_i represents the willingness to recycle, $sociodem_i$ and $attitudes_i$ represent respectively socio-demographic/economic and attitudinal variables derived from individual responses to the questionnaire, and $ethics_i$ is proxy for environmental morale. The variables are described in Table 1.

[Insert Table 1 here]

Table 2 shows three sets of regression results. The first regression considers the impact of socio-demographic/economic variables. The second includes attitudinal variables. Finally, in addition to the socio-economic and attitudinal variables, the model introduces into the regression analysis the index of environmental morale⁷.

⁶ The questionnaire is reproduced in Barile (2012).

⁷ The table also reports the Ramsey RESET test and the Linktest (*_hatsq*) test for the full model specification (i.e., Regression 3). Note that the Ramsey RESET test was performed introducing the predicted values of the dependent variable in their second and third power into the regression and testing the joint significance of the

When using ordered probit regression, estimated coefficients can be interpreted only in terms of their sign and significance level. Estimated parameters provide information in terms of the effects generated on respondents' willingness to strongly contribute to recycling activities. In order to measure the quantitative effect of the independent variables on the ranking information of the dependent variable, marginal effects have also been included in Table 2. For simplicity, the marginal effects are only presented for the highest score of the willingness to voluntarily contribute to recycling (i.e., 5 = very high).

Results in Table 2 can be interpreted as follows. For binary independent variables, the marginal effects represent the change in the probability of reporting a very high contribution that results from changing the base characteristic, holding all other variables constant at their mean values. For non-binary independent variables in levels, the marginal effects measure the impact of a unit increase of the independent variable on the probability of showing a very high contribution to recycling, evaluated at its mean. Finally, for non-binary independent variables that are included in natural logarithmic form, the marginal effect indicates the probability of reporting a very high contribution to recycling arising from a 1% increase in the underlying independent variable from its mean value.

[Insert Table 2 here]

Among the socio-demographic/economic variables (see Table 2, Regression 1) there is strong evidence of gender and age differences. Results suggest that females are more likely to provide a higher contribution to recycling than males (by 2.6%). According to previous analyses (see, for example Torgler and García-Valiñas, 2007), the willingness to contribute shows an inverted U-shaped relationship with age, meaning that the willingness to voluntarily contribute to recycling tends to

respective coefficient estimates (using a Wald test). Both tests suggest the model is well specified and does not suffer from omitted variables (i.e., $\text{Prob} > \chi^2$ and $\text{Prob} > |z|$ are > 0.1 in both cases).

increase with age, though the slope gradually decreases when age just reaches the second category (i.e. 25-34 years) adopted here.

It is interesting to note that the results remain robust when attitudinal variables are introduced (see Table 2, Regression 2) into the regression analysis and when controlling for risk attitudes. Thus, results show: a smaller negative impact of age meaning that older students are more risk averse than younger ones; and a smaller difference between sexes, as generally women are more concerned with the risks associated with a poor quality environment (see Dupont, 2004). However, when ethical considerations are introduced in the analysis (see Table 2, Regression 3) the coefficient of the variable gender becomes less robust in terms of its size and significance level.

A possible explanation for this is that the effect of this variable is partially captured by the index of environmental morale, suggesting evidence for stronger ethical concerns among females. An independent samples *t*-test is used to test this hypothesis (t -test = -7.97, p -value < 0.01). Results suggest that females have a significantly higher (14.69) mean environmental morale score relative to males (13.26), providing evidence in favour of gender differences in individuals' sensitiveness towards the environment.

Europeans living in the UK appear to be less compliant than people from other nationalities in the UK and in Italy (see Table 2, all regressions).⁸ Moreover, in line with predictions (see Table 2, Regression 1), psychologists are significantly more willing to contribute to recycling than economists (by 1.8%).

However, as with the variable gender, these differences become less robust when controlling for attitudinal variables and for environmental morale which represents the most dominant regressor into the analysis. The *t*-test (t -test = -8.61, p -value < 0.01) suggests again that there is a significant difference between individuals' sensitiveness towards the environment, with those who study economics showing a mean score on environmental morale (13.55) significantly lower than those who

⁸ Crociata et al. (2015) estimate that the probability that Italians will recycle is 29% higher in Northern Italy than in Central Italy, or in Southern Italy.

study psychology (15.06). Thus, results provide further evidence on the hypothesis that enrolment in economics is associated with increased instrumental behaviour and free riding – economics students tend to start as, or become closer to, *homo economicus* at university.

Considering the attitudinal variables (see Table 2, regressions 2 and 3), results show that risk aversion positively and significantly (10% level) affect willingness to contribute to recycling, and increases the probability of subjects reporting the highest willingness to contribute between 1.4% and 1.6% points. Social responsibility and altruistic preferences are also of major importance in the decision to participate in recycling. In particular, high levels of social responsibility and strong altruistic preferences were almost 9% more likely to increase contribution to recycling (see Table 2, Regression 2).

Finally, the index of environmental morale has the expected sign and it is highly significant (1% level), suggesting strong evidence of the importance of ethical considerations for the provision of recycling activities. In particular, results show that a 1% increase in the level of environmental morale increases willingness to contribute to recycling by 16.8%. However, given the nature of the index of environmental morale (which is expressed in logarithmic form), results seem to indicate that this effect becomes muted when the index reaches high levels, thus suggesting, quite reasonably, that differences in respondents' contribution to recycling become smaller among those who already exhibit high levels of environmental morale.

The results call in question the relevance of analysis that is premised on *one* representative individual (i.e. a stereotype). Individuals differ in the weight they attach to instrumental and intrinsic motivation. Willingness to recycle household waste depends, in part, on intrinsic motivation. Individuals with higher environmental morale are willing to act more prosocially.

3. The Impact of Different Incentives: A Nudge or a Shove?

Having identified differences in the characteristics of different individuals, the question is whether these differences are relevant when comparing the impact exerted by incentives designed to increase prosocial behaviour.

The first intervention takes the form of a ‘nudge’. It is a ‘nudge’ that relies on the extent to which government intervention *acknowledges* the intrinsic value of action. Low-cost signals emitted when governments intervene are capable of increasing (or demeaning) individuals’ perceptions of the intrinsic value of action (for a survey of this literature see Frey, 1997). A local authority acknowledges the intrinsic value of waste recycling by providing recycling materials (recycling bins) and services without charge (this is the BIN policy).⁹

The second intervention takes the form of a ‘shove’. In this scenario, the local authority threatens to monitor individuals’ compliance and to fine individuals if they do not recycle household waste (this is the FINE policy). Will a nudge be more effective than a shove?

In the questionnaire, respondents were asked to respond to each of these incentives with reference to the extent to which they said that they were willing to recycle in the benchmark (‘counterfactual’) setting (the benchmark reported in section 2 above). Possible responses were: ‘I would exert the same level of effort’, ‘I would increase my effort’, and ‘I would decrease my effort’.

Table 3 reports the proportion of responses to the benchmark and the two hypothetical policy scenarios depending on individuals’ level of environmental morale. For simplicity, the index of

⁹ The bin is offered as a non-monetary gift (designed to increase individuals’ perceptions of the intrinsic value of recycling). As Frey (1997, p. 95) emphasises, non-monetary gifts “...are chosen so that the person’s self-esteem is acknowledged, thereby bolstering the recipient’s work motivation”. In this literature (surveyed by Frey, 1997), responses to non-monetary gifts are very different to responses to payments perceived as subsidies. A non-monetary gift is likely to increase intrinsic motivation. Monetary subsidies are capable of demeaning individuals’ perceptions of the intrinsic value of action.

environmental morale has been grouped in three different categories, showing low (index score < 12), medium (index score = 12) and high level of environmental morale (index score > 12).¹⁰

There is a substantial and significant difference between BENCHMARK VALUES (Pearson's $\chi^2_{(8)} = 134.88$, p -value < 0.01) when comparing those who exhibit high environmental morale and those with low environmental morale. Those with high environmental morale contribute more¹¹. This is consistent with low environmental morale invoking *homo economicus* and high environmental morale invoking *homo behavioural economicus*.

[Insert Table 3 here]

There is also evidence of a difference between individuals' reaction to policy measures depending on individuals' environmental morale (Pearson's χ^2 has p -value < 0.01 in both scenarios). Respondents are more likely to increase their provision. This is the case for responses to a nudge *and* for responses to a shove. While the effect is slightly stronger among those who exhibit low environmental morale, in both scenarios, about 72.60% of respondents with low environmental morale declare they would increase their provision of effort. A detailed analysis of the data (results not reported here) reveals that this trend increases rapidly when approaching a medium level of environmental morale (i.e. 12), but slows down with higher levels of environmental morale (i.e. when the index ranges between 16 and 20).

¹⁰ For simplicity the mid-point category is identified by aggregating the mid-point category (i.e. 3=sometimes) of each single item, which leads to a total of 12. However, all tests remain robust when considering separated levels of environmental morale.

¹¹ It is worth noting that, in addition to recycling, the index of environmental morale is inferred using individuals' willingness to contribute to other 'green' activities. This helps explain why some of the respondents with low environmental morale are also willing to recycle and why some respondents who exhibit medium and high environmental morale seem to be reluctant to contribute to recycling activities.

Table 4 compares raw proportions of individuals' reaction to policy change (RD – see also Table 3 above), with predicted probabilities (PP) of choosing to maintain, increase and decrease efforts, and discrete change in predicted probabilities (Δ PP) when the level of environmental morale varies from its minimum to its maximum value. Predicted probabilities and change in predicted probabilities are obtained using multinomial regression analyses on both hypothetical scenarios while holding all variables at their mean values¹². The 95% confidence intervals for predicted probabilities (95% CI) are also included in the table.

[Insert Table 4 here]

When comparing the two policies there appears to be *policy invariance* (respondents express similar responses to the introduction of both policies). The *dominant* response is to increase effort in the case of the BIN policy *and* in the case of the FINE policy. This interpretation is robust when looking at raw data (67.3% and 64.6% respectively in the BIN and FINE scenarios) and when comparing predicted probabilities from the multinomial regression analyses (69.3% and 67% respectively in the BIN and FINE scenarios).

However, when focusing on the impact of the policies with *different* environmental morale, this (dominant) response is quite different. Figure 1 plots PP values for *this* response against environmental morale in log form. The Figure suggests that more individuals with low environmental morale will increase their recycling effort if there is a fine. By comparison, it also suggests that more individuals with high environmental morale are likely to increase their recycling efforts if the government offers recycling bins to acknowledge the intrinsic value of the *act* of recycling. When an individual is more akin to *homo economicus* (with little - or no - intrinsic motivation) the individual is more sensitive to the *threat* of a fine. However, when individuals are more akin to *homo behavioural*

¹² For the sake of brevity, main results are reported in Appendix A. Full results are available from the authors on request.

economicus (with high intrinsic motivation) they are more sensitive to the low-cost signals emitted by a nudge (signals that acknowledge the intrinsic value of action). Individuals with high environmental morale are far responsive to a nudge than they are to a shove. They are more likely to respond positively to a nudge (that increases perceptions of the intrinsic value of action).

[Insert Figure 1 here]

The results illustrated in Figure 1 suggest that the fine is more likely to produce a greater proportion of individuals with low environmental morale who say they are willing to *increase* recycling (than say they would increase recycling if there is a nudge). By comparison, a nudge is more likely to produce a greater proportion of individuals with high environmental morale who say they are willing to *increase* recycling (than say they would increase recycling if there is a fine).¹³

Returning to the results reported in Table 4, it is also possible to consider the discrete change in the probability that policy will increase recycling when moving from the minimum to the maximum value of environmental morale. The probability that there will be an increase in effort *increases* by 0.054 (95% CI: -0.183, 0.292) when the government offers bins but *decreases* by as much as 0.295 (95% CI: -0.463, -0.127) when the government threatens that individuals will be fined.

This result is important in the context of the recent enthusiasm to rely on a nudge. Whether a nudge is the best option depends on the description of the ‘representative’ individual and, when designing policy, this is the individual that best represents the nature of the individuals that are to be targeted. While a comparison of the entire cohort that responded to the questionnaire suggested that both incentives (a nudge and a shove) will exert the same impact, a closer analysis indicates that a nudge is more likely to be effective in increasing willingness to recycle when focussing only on

¹³ As noted above, results reported in this paper have been tested for robustness. When the extent to which individuals recycle is excluded from the index of environmental morale, there is the same pattern as illustrated in Figure 1. A fine has a greater impact on individuals with low environmental morale and a nudge has a greater impact on individuals with a high environmental morale.

individuals with high environmental morale. It is not the case that the same incentive will be equally effective for all individuals. One size does not fit all!

4. The Determinants of ‘Environmental Morale’

If it is important to know more about individuals when designing incentives to increase prosocial behaviour, is it possible to gauge the extent to which they are likely to rely on intrinsic motivation? In this section of the paper the objective is to illustrate the difficulties that policymakers are likely to experience. Is it possible to rely on low- cost socio-economic data?

The difficulties that policymakers are likely to experience can be illustrated with reference to data gathered in the questionnaire; data that can be employed to predict the extent to which respondents are likely to be motivated by perceptions of the intrinsic value of action. With insights into the determinants of environmental morale, policymakers are able to choose the incentives that will have the greatest impact on individuals’ willingness to increase recycling behaviour, a type of ‘effective market’ principle.

It is reasonable to assume that most of the socio-demographic/economic and attitudinal variables discussed in section 2 might also play a role in explaining what shapes environmental morale. Table 5 reports regression results of all socio-demographic/economic and attitudinal variables on environmental morale¹⁴.

[Insert Table 5 here]

In general, results shown in Table 5 follow the same pattern as those presented in Table 2, in terms of the signs and significance levels of the estimated coefficients (although they differ in their

¹⁴ The Ramsey RESET test and the Linktest test suggested the employment of a level-log model specification (Prob > F and Prob > |t| are > 0.1 in both cases). However, differently from the ordered probit regression analysis, the Ramsey RESET test was performed here introducing the predicted values of the dependent variable in their second, third and fourth power into the regression and testing the joint significance of the respective coefficient estimates (i.e., using an *F*-test).

relative magnitude). This said, when looking at the two regressions in Table 5, the insight provided by the ‘more costly’ attitudinal variables is important. The comparison suggests that policymakers will require the ‘more costly’ information to fine tune their use of incentives. The results in Table 5 suggest a strong correlation between environmental morale and willingness to voluntarily contribute to recycling activities (Pearson correlation is 0.36, significant at the 1% level). They intimate that social responsibility and altruism play an important role in determining individuals’ moral obligation towards the environment. This interpretation is consistent with the proposition that it will be expensive to ascertain the extent to which a representative individual is more like *homo behavioural economicus* than *homo economicus*.

The results reported in Table 5 indicate, once again, that gender matters; females exhibit greater environmental morale. It is also the case that a one percentage increase in the level of financial satisfaction is associated with a modest decrease of individuals’ environmental morale (between 0.0045 and 0.0061). This is consistent with a narrowly self-interested actor whose focus is income. Interestingly, this relationship becomes stronger in size when attitudinal variables are introduced into the regression.

The results highlight a negative relationship between religion and environmental morale. Table 5 (regression 2) shows that, as the importance of religion increases, the level of environmental morale decreases by 0.134 (at the 5% significance level). The question included in the survey served as a proxy for “religious identity salience” (see Torgler, 2006, p.118). In contrast with predictions, it seems that religious individuals may be more concerned with heavenly concerns than with earthly ones.

In this study it is not easy to predict from low-cost, socio-economic, indicators the extent to which individuals rely on intrinsic motivation. It is likely to be costly to identify the extent to which individuals are likely to rely on perceptions of the intrinsic value of prosocial behaviour. In the absence of this information it is far from obvious that reliance on a nudge (that changes perceptions of

the intrinsic value of action) is always better than reliance on extrinsic incentives (taxes, subsidies, regulation).

5. Conclusions

The objective in this study was to consider ‘...when and why...’ incentives nurture prosocial behaviour. A well-established literature has considered: the form that incentives take (monetary or non-monetary); the way that incentives interact with intrinsic motivation and with social motivation; the length of time over which incentives operate (and what happens when incentives are removed). But what of the relevance of the way that incentives are received? In this paper the impact of each incentive depended on the way the incentive was designed *and* on the way that it was received. The combination of characteristics employed to describe individuals was relevant when assessing the efficacy of alternative incentives. The implication is that an incentive of one form (e.g. monetary or non-monetary) might well be more effective than an alternative when targeted on one cohort of individuals, but less effective when targeted on a different group of individuals.

Here the first conclusion is that, when making predictions and when designing policy, it is important to focus on descriptions of the individuals who are representative of the *target group*. In neoclassical economics, analysts focus on the behaviour of instrumental *homo economicus*. In behavioural economics, analysts focus on the behaviour of *homo behavioural economicus* (driven by a specific mix of instrumental and intrinsic motivation). When making predictions and when designing policy, it is a mistake to rely on either of these individuals as *stereotypes*. Individuals differ with reference to their position on a spectrum that runs from *homo economicus* (reliant on instrumental motivation) to individuals who rely entirely on intrinsic motivation. The ‘representative individual’ is the individual whose characteristics best represents the mix of instrumental and intrinsic motivation in the target cohort. In this paper, differences in environmental morale are relevant when predicting individuals’ willingness to recycle household waste.

The second conclusion is that *differences in the extent to which individuals rely on intrinsic motivation* are important when comparing the efficacy of incentives designed to increase prosocial behaviour. In this paper, initial comparisons of the impact of a nudge and a shove suggested that both were equally effective in increasing willingness to recycle household waste (i.e. *policy invariance*). However, closer analysis indicated that this assessment is sensitive to the extent to which the targeted group is motivated by ‘environmental morale’. It is not possible to conclude that one policy will always be more effective than another. If a group of individuals have high ‘environmental morale’, a nudge is more effective in increasing individuals’ willingness to increase their level of waste recycling. If a group of individuals have low ‘environmental morale’, a shove (produced by the threat of fine) is more effective in increasing individuals’ willingness to increase their level of waste recycling.

With new insights from behavioural economics, governments appear to have a predilection for policies that nudge. In the UK, the government has set up the Cabinet Office Behavioural Insights Team and there is concern that the government has a greater preference than can be justified for policies that nudge (e.g., Oliver, 2013). In this paper the evidence suggests that a nudge is more likely to be effective when there is something to nudge! The evidence suggests that a nudge will be more effective the more individuals are motivated by the intrinsic value of action.

The final conclusion is that it is unlikely to be the case that policymakers will find it easy to know the extent to which individuals rely on intrinsic motivation. It is not likely that the information they acquire from low-cost socio-economic indicators will be sufficient. There is no quick and easy substitute for questionnaire studies that rely on attitudinal variables to gauge the extent to which individuals rely on intrinsic motivation.

Of course, there is an important qualification. These conclusions are premised on student responses (to questionnaires) and student responses do not allow very much variation in some of the socio/demographic – economic indicators (e.g. age, financial satisfaction, occupational and marital

status).¹⁵ While freely acknowledging this qualification, it is important to note that a well-established experimental literature relies very heavily on students' responses and, as Alm and Jacobson (2007, p. 143) note, "there is no reason to believe that the cognitive processes of students are different from those of "real" people".

Here the over-arching conclusion is that one form of incentive (e.g. monetary or non-monetary) will not always produce a greater impact than another. When selecting incentives to nurture prosocial behaviour, 'one size will not fit all'. It is not sufficient to know that both intrinsic and instrumental motivations are relevant. To compare the efficacy of incentives designed to increase prosocial behaviour it is important to know the *extent* to which individuals rely on intrinsic motivation.

¹⁵ There is now a recognition that the overwhelming majority of empirical results reported in journals are WEIRD in that they involve individuals in societies that are Western, Educated, Industrialised, Rich and Democratic and, as such, do not lend themselves an external validity beyond this "... thin, and rather unusual slice of humanity." (Henrich et al., 2010, p. 1).

References

- Abbott, A., Nandeibam, S., O'Shea, L., 2013. "Recycling: social norms and warm glow revisited." *Ecological Economics* 90, 10-18.
- Andreoni, J., 1990. "Impure altruism and donations to public goods: a theory of warm-glow giving." *Economic Journal* 100, 466-77.
- Alm, J., Jacobson, S., 2007. "Using Laboratory Experiments in Public Economics." *National Tax Journal* 60 (1), 129-152.
- Barile, L., 2012. *The Impact of Governmental Signals on Environmental Morale. A Behavioural Approach*. Working paper 3/12, Department of Economics, University of Bath (UK).
- Berglund, C., 2006. "The assessment of households' recycling costs: The role of personal motives." *Ecological Economics* 56, 560-569.
- Brekke, K.A., Kverndokke, S., Nyborg, K., 2003. An economic model of moral motivation. *Journal of Public Economics* 87, 1967-1985.
- Brennan, G., Lomasky, L., 1993. *Democracy and Decision; the Pure Theory of Electoral Preference*. Cambridge: Cambridge University Press.
- Cipriani, G.P., Lubian, D., Zago, A., 2009. "Natural born economists?" *Journal of Economic Psychology*, 30, 455-468.
- Crociata, A., Agovino, M. and Sacco P.L. 2015. Recycling waste: Does culture matter? *Journal of Behavioral and Experimental Economics* 55, 40-47.
- De Young, R., 1996. Some psychological aspects of reduced consumption behaviour: the role of intrinsic satisfaction and competence motivation. *Environment and Behaviour* 28, 358-409.
- Deci, E. L., 1971. "Effects of externally mediated rewards on intrinsic motivation." *Journal of Personality and Social Psychology* 18, 105-15.

- Deci, E.L., Ryan, R..M., 1985. *Intrinsic Motivation and Self Determination in Human Behavior*. New York: Plenum Press.
- Dupont, D. P., 2004. "Do children matter? An examination of gender differences in environmental valuation". *Ecological Economics* 49, 273-286.
- Frey, B.S. 1997. *Not Just for the Money: An Economic Theory of Personal Motivation*. Cheltenham: Edward Elgar.
- Gneezy, U., Meier, S., Rey-Biel, P., 2011. "When and Why Incentives (Don't) Work to Modify Behavior." *Journal of Economic Perspectives* 25(4), 191-210.
- Henrich, J., Heine, S.J., Norenzayan, A., 2010. "The weirdest people in the world?" *Behavioral and Brain Sciences* 33, 1-23.
- Kinnaman, T., 2006. "Policy watch: examining the justification for residential recycling." *Journal of Economic Perspectives* 20, 219-32.
- Mullainathan, S., Thaler, R. H., 2000. *Behavioural Economics*. NBER Working Paper 7948.
- Oliver, A., 2013. From Nudging to Budging: Using Behavioural Economics to Inform Public Sector Policy. *Journal of Social Policy* 42, 685-700.
- Stigler, G., Becker, G., 1977. "De gustibus non est disputandum." *American Economic Review* 67, 76-90.
- Thaler, R. H., Sunstein, C. R., 2008. *Nudge: Improving Decisions about Health, Wealth and Happiness*. Yale University Press: New Haven, CT.
- Torgler, B., 2005. "Tax morale and direct democracy." *European Journal of Political Economy* 21, 525-531.
- Torgler, B., 2006. "The importance of faith: Tax morale and religiosity." *Journal of Economic Behavior and Organization* 61, 81-109.

Torgler, B., García-Valiñas, M. A., 2007. "The determinants of individuals' attitudes towards preventing environmental damage." *Ecological Economics* 63, 536-552.

Appendix A

Table A.1: Willingness to change effort relative to category 1 (= same level of effort)

Model	Environmental Morale (log)		
	β	z-score	M.E.
<i>Bin scenario</i>			
Increase	-0.585	-1.59	-0.063
Decrease	-2.309***	-4.00	-0.068***
Same Level of effort	-	-	0.132*
<i>Fine scenario</i>			
Increase	-1.392***	-4.05	-0.283***
Decrease	-2.635***	-3.31	-0.022**
Same Level of effort	-	-	0.306***
Sample size	1,160		

Notes: Multinomial logit regression analyses. Full model as in Table 2, regression 3 (see section 2 above). The reference category is 1 (= same level of effort). In the BIN scenario the sample size = 1,160 (willingness to increase effort = 784, willingness to decrease effort = 56). In the FINE scenario the sample size = 1,160 (willingness to increase effort = 753, willingness to decrease effort = 36). *, ** and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Robust standard errors.

Table 1: A description of the variables

Independent variables (expected sign)	Description ¹⁶
<i>Socio-demographic/economic variables</i>	
Gender (+)	1 if female, 0 if male
Age (+/-)	Respondent's age measured in 5 categories, ranging between 1 if falling into category (15-24), and 5 if falling into category (55-64)
Working (+/-)	1 if working student, 0 otherwise
Never married (+/-)	1 if never married, 0 otherwise
Financial satisfaction/log (+)	The degree of respondents' financial satisfaction (1 if extremely dissatisfied, 10 if extremely satisfied)
Religion (+)	The degree to which respondents feel religion is important (1 if not at all important, 5 if very important)
European (+/-)	1 if European living in the UK, 0 otherwise ^a
Psychologists (+)	1 if psychologist, 0 otherwise
<i>Attitudinal variables</i>	
Risk (+/-)	1 if risk averse, 0 otherwise ^b
Trust in government (+)	The degree of respondents' confidence in governments (1 if none at all, 5 if a great deal)
Social responsibility/log (+)	Respondents' level of social responsibility (multi-item index ranging between 4 and 20 ^c)
Altruism (+)	The degree to which respondents feel 'service to others' is important in their life (1 if not at all important, 5 if very important)
<i>Ethics</i>	
Environmental morale/ log(+)	Respondents' level of environmental morale (multi-item index ranging from 4 to 20)

^a This interaction term has been introduced in the regression analysis to take into account differences in nationalities and in data collection location. ^b Risk aversion is inferred from a list of attributes related to a job position that respondents were required to rank according to their relative importance. Those who put as their first or second choice 'A safe job with no risk' were considered as risk averse. ^c This variable is based on respondents' opinion about the justifiability of: cheating on taxes, throwing away litter in a public place, avoiding a fare on public transport, and smoking in a public place.

¹⁶ In order to analyse the impact of age, marital status, occupation and nationality, a number of dummy variables were also used. However, none of them were statistically significant.

Table 2: BENCHMARK contribution – Ordered Probit Results (Full sample)

Independent variables	Regression 1		Regression 2		Regression 3	
	β	M.E.	β	M.E.	β	M.E.
<i>Socio-economic demographic variables</i>						
Gender	0.192*** (2.65)	0.026*** (2.69)	0.157** (2.16)	0.020** (2.20)	0.091 (1.24)	0.011 (1.26)
Age	1.11** (2.23)	0.154** (2.23)	1.04** (2.15)	0.138** (2.15)	0.838* (1.71)	0.103* (1.70)
Age2	-0.264** (-2.22)	-0.036** (-2.23)	-0.259** (-2.28)	-0.034** (-2.28)	-0.223** (-1.97)	-0.027** (-1.96)
Working student	0.246 (1.74)	0.040 (1.51)	0.202 (1.42)	0.030 (1.25)	0.186 (1.22)	0.026 (1.07)
Never married	0.020 (0.13)	0.003 (0.14)	-0.049 (-0.32)	-0.007 (-0.03)	-0.227 (-1.45)	-0.032 (-1.26)
Financial satisfaction (log)	-0.057 (-0.72)	-0.008 (-0.71)	-0.096 (-1.21)	-0.013 (-1.20)	-0.046 (-0.58)	-0.006 (-0.58)
Religion	-0.006 (-0.22)	-0.001 (-0.22)	-0.039 (-1.43)	-0.005 (-1.42)	-0.024 (-0.86)	-0.003 (-0.86)
European	-0.531*** (-8.06)	-0.069*** (-7.35)	-0.50*** (-6.79)	-0.062*** (-6.45)	-0.452*** (-6.22)	-0.052*** (-5.80)
Psychologists	0.129* (1.83)	0.018* (1.80)	0.074 (1.03)	0.010 (1.02)	-0.038 (-0.51)	-0.005 (-0.51)
<i>Attitudinal variables</i>						
Risk			0.120* (1.80)	0.016* (1.74)	0.112* (1.69)	0.014* (1.63)
Trust in government			0.054 (1.35)	0.007 (1.36)	0.040 (0.98)	0.005 (0.99)
Social responsibility (log)			0.470*** (2.69)	0.062*** (2.70)	0.171 (0.99)	0.021 (0.99)
Altruism			0.184*** (4.44)	0.024*** (4.24)	0.109*** (2.63)	0.013*** (2.58)
<i>Ethics</i>						
Environmental morale (log)					1.37*** (8.32)	0.168*** (7.75)
Sample size	1,161		1,160		1,160	
Prob > χ^2	0.000		0.000		0.000	
Pseudo R ²	0.030		0.044		0.073	
Prob > χ^2 Ramsey RESET Test					0.154	
Prob> z Linktest (<i>_hat</i>) Test					0.006	
Prob> z Linktest (<i>_hatsq</i>) Test					0.143	

Notes: *, **, *** , denote significance level at 10%, 5%, and 1% respectively. (.) denotes z-score. Robust standard errors.

Table 3: Proportion of responses according to individuals' level of environmental morale

(BENCHMARK VALUES ^a)				
Effort\Environmental Morale	Low	Medium	High	No. Obs.
Low	41.83%	20.43%	10.88%	17.17%
Medium	34.13%	46.24%	42.01%	40.94%
High	24.04%	33.33%	47.10%	41.89%
No. Obs.	17.85%	7.98%	74.16%	100.00%
Pearson χ^2 (8) = 134.88 , p-value = 0.00				
(BIN scenario)				
Effort\Environmental Morale	Low	Medium	High	No. Obs.
Same effort	19.71%	26.88%	29.98%	27.90%
Increase effort	72.60%	65.59%	66.20%	67.20%
Decrease effort	7.69%	7.53%	3.82%	4.81%
No. Obs.	17.85%	7.98%	74.16%	100.00%
Pearson χ^2 (4) = 14.21 , p-value = 0.00				
(FINE scenario)				
Effort\Environmental Morale	Low	Medium	High	No. Obs.
Same effort	20.67%	33.33%	34.95%	32.27%
Increase effort	72.60%	64.52%	62.73%	64.64%
Decrease effort	6.73%	2.15%	2.31%	3.09%
No. Obs.	17.85%	7.98%	74.16%	100.00%
Pearson χ^2 (4) = 24.02 , p-value = 0.00				

^a For simplicity responses to the BENCHMARK VALUES have been grouped.

Table 4: Individuals' responses to policy changes

<i>BIN</i>	<i>RD</i>	<i>95% CI</i>	<i>FINE</i>	<i>RD</i>	<i>95% CI</i>
Same	0.279	-	Same	0.322	-
Increase	0.673	-	Increase	0.646	-
Decrease	0.041	-	Decrease	0.031	-
	<i>PP</i>	<i>95% CI</i>		<i>PP</i>	<i>95% CI</i>
Same	0.268	[0.241, 0.295]	Same	0.316	[0.288, 0.344]
Increase	0.693	[0.665, 0.722]	Increase	0.670	[0.641, 0.698]
Decrease	0.037	[0.025, 0.050]	Decrease	0.013	[0.006, 0.020]
	$\Delta PP _{EM=Min \rightarrow Max}$	<i>95% CI</i>		$\Delta PP _{EM=Min \rightarrow Max}$	<i>95% CI</i>
Same	0.204	[0.054, 0.354]	Same	0.367	[0.252, 0.483]
Increase	0.054	[-0.183, 0.292]	Increase	-0.295	[-0.463, -0.127]
Decrease	-0.259	[-0.494, -0.023]	Decrease	-0.072	[-0.199, 0.054]

Notes: RD = Raw Data, PP = Predicted Probabilities, $\Delta PP|_{EM=Min \rightarrow Max}$ = Discrete Change in PP. Confidence intervals (95% *CI*) are obtained using the delta method in Stata.

Table 5: Environmental morale - OLS Results (Full sample)

Independent Variables	Regression 1	Regression 2
	β	B
<i>Socio-economic demographic variables</i>		
Intercept	10.187*** (6.76)	1.508 (0.76)
Gender	0.853*** (4.39)	0.701*** (3.80)
Age	3.181** (1.98)	2.762* (1.91)
Age2	-0.601* (-1.57)	-0.546 (-1.57)
Working student	0.306 (0.81)	0.150 (0.43)
Never married	1.531*** (2.96)	1.187*** (2.69)
Financial satisfaction (log)	-0.454** (-2.08)	-0.612*** (-3.18)
Religion	-0.011 (0.16)	-0.134** (-1.90)
European	-0.913*** (-5.31)	-0.747*** (-3.95)
Psychologists	1.369*** (7.74)	1.086*** (6.11)
<i>Attitudinal variables</i>		
Risk		0.126 (0.73)
Trust in government		0.157 (1.53)
Social responsibility (log)		2.514*** (4.47)
Altruism		0.727*** (7.37)
Sample size	1,161	1,160
Prob > F	0.000	0.000
R ²	0.168	0.127
Prob > F Ramsey RESET Test		0.319
Prob > t Linktest (<i>_hat</i>) Test		0.021
Prob > t Linktest (<i>_hatsq</i>) Test		0.269

Notes: *, **, ***, denote significance level at 10%, 5%, and 1% respectively. (.) denotes *t*-statistic. Robust standard errors.

Figure 1: Economic actor, environmental morale and policy susceptibility

