



The environmental footprints of conservationists, economists and medics compared



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ABSTRACT

Many conservationists undertake environmentally harmful activities in their private lives such as flying and eating meat, while calling for people as a whole to reduce such behaviors. To quantify the extent of our hypocrisy and put our actions into context, we conducted a questionnaire-based survey of 300 conservationists and compared their personal (rather than professional) behavior, across 10 domains, with that of 207 economists and 227 medics. We also explored two related issues: the role of environmental knowledge in promoting pro-environmental behavior, and the extent to which different elements of people's footprint co-vary across behavioral domains. The conservationists we sampled have a slightly lower overall environmental footprint than economists or medics, but this varies across behaviors. Conservationists take fewer personal flights, do more to lower domestic energy use, recycle more, and eat less meat - but don't differ in how they travel to work, and own more pets than do economists or medics. Interestingly, conservationists also score no better than economists on environmental knowledge and knowledge of pro-environmental actions. Overall footprint scores are higher for males, US nationals, economists, and people with higher degrees and larger incomes, but (as has been reported in other studies) are unrelated to environmental knowledge. Last, we found different elements of individuals' footprints are generally not intercorrelated, and show divergent demographic patterns. These findings suggest three conclusions. First, lowering people's footprints may be most effectively achieved via tailored interventions targeting higher-impact behaviors (such as meat consumption, flying and family size). Second, as in health matters, education about environmental issues or pro-environmental actions may have little impact on behavior. Last, while conservationists perform better on certain measures than other groups, we could (and we would argue, must) do far more to reduce our footprint.

1. Introduction

Conservationists fly, sometimes a lot more than our fellow citizens (Fox et al., 2009; Grémillet, 2008). We buy a lot of computers; and some of us – even some marine experts - eat swordfish (Bearzi, 2009). These specific examples highlight a much broader and deeply worrying issue. Conservation is fundamentally about changing people's behavior. As such, conservationists should be in the vanguard – actively (and visibly) adopting pro-environmental behaviors in their personal lives in order to lower our own footprints as much as possible. Failure to do so risks undermining the credibility of the conservation movement. Documenting and understanding our failings, however, might also help identify ways of catalysing and accelerating change across society as a

whole.

With this in mind we conducted a wide-ranging questionnaire-based assessment of the environmental footprint of individuals linked to conservation groups (hereafter “conservationists”). Because it is possible that the published examples of conservationists' excess are exceptional and do not generalise, we quantified people's actions across 10 diverse behavioral domains, from recycling to having children, considered to be relevant to environmental impact and over which we suggest individuals have at least some degree of control. Because many other variables impact pro-environmental behaviors – most obviously demographic attributes such as age, gender and income (Alcock et al., 2017; Csutora, 2012; Gatersleben et al., 2002; Gifford and Nilsson, 2014; Jones and Kammen, 2011; Kollmuss and Agyeman, 2002) - we

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also collected information on these variables, and adjusted our assessments of conservationists' footprints to take them into account. And to help put these findings into context, we extended our sample to two groups with broadly similar educational and applied characteristics – those linked to economics and to biomedical groups (hereafter “economists” and “medics” respectively).

Conservationists might be expected to know more about environmental problems and solutions than these other groups, so this comparison also enabled us to explore one of the core notions of environmental education: that enhanced knowledge promotes greater pro-environmental behavior. Despite observed associations between knowledge and actions (Bamberg and Möser, 2007; Hines et al., 1987), the correlational evidence for this intuitive premise is complex. The essentially linear idea that enhanced knowledge promotes greater awareness in turn triggering pro-environmental behavior is no longer accepted (yet as Kollmuss and Agyeman, 2002 point out, still forms the basis of many NGO and government communications campaigns). Instead, it seems many other psychological and societal factors also influence the expression of pro-environmental behaviors - including values (the importance individuals attach to issues; Bolderdijk et al., 2013; Gromet et al., 2013; Li et al., 2016; Reddy et al., 2017); social norms (and the role of consumption in social signalling; Bamberg and Möser, 2007; Csutora, 2012; Jackson, 2004; Kahan et al., 2012; Kollmuss and Agyeman, 2002; Reddy et al., 2017; Steg and Vlek, 2009; Thøgersen, 2014; Vermeir and Verbeke, 2008); structural, cognitive and economic constraints (which may make more sustainable alternatives unavailable; Csutora, 2012; Gifford and Nilsson, 2014; Jackson, 2004; Kennedy et al., 2009; Kollmuss and Agyeman, 2002); individuals' perceptions of their control over outcomes (Bamberg and Möser, 2007; Gifford and Nilsson, 2014; Hines et al., 1987; Kennedy et al., 2009; Kollmuss and Agyeman, 2002); people's ingrained habits (Jackson, 2004; Steg and Vlek, 2009; Thøgersen, 2014); and so-called choice architecture (the way in which alternatives are presented, with easier, more attractive or default options often perpetuating the status quo; Marteau, 2017; Reddy et al., 2017; Sunstein and Reisch, 2014). Experiments offer some scope for isolating the effects of knowledge from these other factors, but where knowledge effects have been identified they often appear specific to particular behaviors and audiences (Abrahamse et al., 2007; Bolderdijk et al., 2013; Gromet et al., 2013; Huffman, 2009; Kahan et al., 2012; Osbaldiston and Schott, 2012). A further problem is the difficulty of teasing-out long-term impacts from experiments – where exposures are typically brief, and prone afterwards to dilution by many confounding effects. Through their jobs and/or interests we expect that the conservationists we sampled have experienced much longer-term exposure to environmental information than have other respondents. We therefore used our comparison of conservationists with other groups to examine associations between such exposure, environmental knowledge and pro-environmental behaviors, adjusting as far as possible for the effects of other factors.

By generating data on many different aspects of peoples' environmental footprints our survey also provides an opportunity to examine a third issue of considerable practical relevance: how far patterns of pro-environmental behavior co-vary across different domains. Are people that are pro-environmental in one aspect of their lives likely to be so in others, and are the predictors of different behaviors similar across domains? Evidence for such co-variation – for what has been termed the “pro-environmental consistency hypothesis” (Alcock et al., 2017) - is so far rather weak (e.g. Alcock et al., 2017; Barr et al., 2010; Kennedy et al., 2015; Painter et al., 1983). To the extent there are congruent patterns, interventions to shift behaviors could perhaps be generalized, but to the extent they are divergent, interventions probably need to be tailored to specific behaviors and groups (Alcock et al., 2017; Kennedy et al., 2015; McKenzie-Mohr et al., 1995; Osbaldiston and Schott, 2012; Painter et al., 1983). We thus used our measures of different pro-environmental actions to look at how far people behave consistently across behavioral domains, and at how far predictors of inter-individual

variation show similarities across behaviors.

2. Materials and methods

Between July and October 2015 we surveyed pro-environmental behaviors and their co-variates through an anonymous questionnaire (Appendix A). After piloting the survey iteratively with 36 undergraduate and graduate students at the Universities of Cambridge and Vermont and receiving approval from the University of Cambridge Ethics Review Group we distributed it electronically via conservation, economics and biomedical organisations to targeted newsletters, mailing lists and social media groups. Respondents were self-selected and thus (as in most studies of this nature) were a non-representative sample. We assigned respondents to our three groups simply based on whether they responded to a communication from a conservation, an economics or a biomedical organisation. The questionnaires were accessed and returned to us via SurveyMonkey (SurveyMonkey Inc., n.d.). Background socio-economic questions asked respondents about their gender, age, nationality, occupation, level of education, household income and size and level of charitable donations. We also asked respondents to rank the importance they attach to the environment (relative to education, the economy, healthcare and immigration; for analysis we reversed the ranks, so that 5 = highest importance). We assessed knowledge about the environment by asking six factual questions about human populations, atmospheric change and species extinction; and knowledge about pro-environmental actions from a multiple-response question about how citizens could most effectively lower their carbon footprint.

Our key behavioral questions (Table 1) asked participants about several behaviors known to cause negative or positive environmental impacts: whether they walked, cycled or used public transport to get to work (Ercan et al., 2016); how often they flew (for work or personal reasons, which we analysed separately; Miyoshi and Mason, 2009); energy-saving measures in their homes (Dietz et al., 2009); whether they offset their energy or travel footprint (Gössling et al., 2007); their level of recycling and composting (Hermann et al., 2011); their production of food waste (Garnett, 2011); their consumption of meat or fish (Tilman and Clark, 2014); their use of bottled water (Botto et al., 2011); the number of children they have (or hope to have; Murtaugh and Schlax, 2009); and their ownership of cats and dogs (Ravilious, 2009). We also invited respondents to give reasons for their answers. Whilst the domains we selected do not enable us to carry out a comprehensive environmental footprint, they do give us a broad indication of respondents' relative environmental performance and allow us to investigate correlations between different behaviors.

Using self-reporting to estimate people's footprints means that impacts may be underestimated as a result of social desirability bias (the tendency to give answers that convey a favorable impression; Gatersleben et al., 2002; Kormos and Gifford, 2014). However, here we are interested in a diverse range of behaviors (many of which are not amenable to more direct measurement – Abrahamse et al., 2007), and are focused not on absolute impacts but on differences across individuals; we are therefore relying on the less extreme assumption that any biases are relatively consistent across respondents (but see Discussion). To tackle the related problem that some self-reported pro-environmental behaviors may have little beneficial impact (Bleys et al., 2017; Csutora, 2012; Kennedy et al., 2015) we used the literature and online calculators to estimate the difference in resulting greenhouse gas emissions of the 5th-percentile and 95th-percentile of respondents, when ranked for each behavior in turn (see Table 1; though note that this of course overlooks other components of the environmental footprint of these behaviors).

In total, 734 participants completed the questionnaire – 300 conservationists, 207 economists and 227 medics; 329 respondents were UK nationals, and 132 were US nationals. There were some similarities in the profiles of those sampled in each group (summarised in Table 2) –

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