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Pro-environmental norms and subjective well-being: panel evidence from the UK

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Abstract

Tying in with a small number of studies on green norms, identity and subjective well-being, this paper studies the relationship between holding a green self-image and life satisfaction in the UK. Focusing on (sub-national) regions as the unit of reference, we investigate if and how the individual-level greenness-satisfaction relationship varies with measures of the prevalence and distribution (disparity) of greenness at the regional level, taking these measures as indicators of a green social norm. Two key findings emerge from our analysis. First, life satisfaction is negatively related to the regional-level mean (prevalence) and positively related to the regional-level diversity of greenness, while being unrelated to the degree of polarization of greenness. Taking the prevalence as a direct and diversity as an inverse measure of the validity of a greenness norm, these results are consistent with the idea that the norm is experienced (by greens) as a standard of reference in the process of green status competition or (by non-greens) as a source of social pressure. Second, the well-being benefits from holding a greener self-image are unrelated to the prevalence and diversity of greenness, but positively related to the polarization of greenness for those either very green or not green at all. This is consistent with the idea that green self-image yields well-being benefits through identity, that is, by identifying with the own group and differentiating oneself from other groups – a possibility that relies on sufficiently large differentiation/polarization of groups. We discuss differences between these results and previous findings based on measures of nation-wide prevalence and disparity of greenness.

Keywords: subjective well-being, norms, green behavior, green self-image, fractionalization, polarization

JEL-codes: I31, Q51, Q58, Z13

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1. Introduction

Our well-being often does not depend on absolutes but on the relative levels we achieve, for instance our well-being gain from income depends on aspirations (Graham and Pettinato, 2002; Stutzer, 2004), reference incomes of our peers (Ferrer-i-Carbonell, 2005; Clark et al., 2008) or income inequality more generally (Graham, 2017). Similar relative effects are also found when it comes to unemployment: being unemployed alone more severely depresses well-being than when unemployment is the norm (Clark et al., 2003).

Relative or contextual effects are not restricted to outcome variables, such as income or the employment status, but apply to environmental behavior as well. Focusing on this domain, one branch of the well-being literature has found green behavior to be associated with higher subjective well-being (Brown and Kasser, 2005; Jacob et al., 2009; Welsch and Kühling, 2010, 2011; Xiao and Li, 2011; Kasser, 2017; Schmitt et al. 2018; for a discussion see Welsch, 2019), whereas studies on green competitive altruism and green status seeking (Griskevicius et al., 2010; Sexton and Sexton, 2014; Welsch and Kühling, 2016) have highlighted the role of others' behavior by demonstrating that green behavior can be driven by peer group considerations.

While the bulk of this research has focused on green *behavior*, two recent papers studied the relationship between well-being and one's green self-image. Using panel data from the UK, Binder and Blankenberg (2017) found evidence that it is green self-image rather than green behavior that is related to greater well-being. Welsch and Kühling (2018) used repeated cross-sections from 35 European countries to look into possible contextual effects in the relationship

between green self-image and subjective well-being. Considering both the mean and distribution (disparity) of green self-image (by country-year) they found significant well-being benefits from being green, which were smaller in societies in which the distribution of green-self-image is characterized by more disparity. Taking attitude disparity as an inverse measure of the validity of a green social norm, they interpreted their results as suggesting that part of the well-being benefit from being green derives from adherence to that norm.

We take the analysis of Welsch and Kühling (2018) as our starting point and set out to better understand the norm and contextual effects in the relationship between green self-image and subjective well-being, focusing now on a within-country context. We contribute to this nascent literature both methodologically and substantively. First, we simultaneously include variables for green behavior as well as green self-image, whereas Welsch and Kühling (2018) did not have the data to control for actual green behavior so that it is not entirely clear whether the green variable picks up differences in green behavior or self-image. Second, we study the pertinent relationships within a panel data framework, thus being able to mitigate concerns about fixed personality traits or inter-country differences in response-styles driving our results. Third, by focusing on one country (the UK) we study whether contextual effects on well-being can also be found at the cross-regional level (within a country) rather than the cross-country level and, if so, whether they differ from those at the cross-country level. Fourth, we study whether green context affects the well-being of green and non-green individuals differently.

The context variables that we consider are the prevalence, diversity, and polarization of green self-image. Prevalence (as measured by regional mean level of green self-image) is intended to capture the reference standard or norm against which individuals assess their own greenness.

We maintain that the reference standard can affect green and non-green people alike: For the former, it acts as a benchmark in green status competition (Welsch and Kühling, 2016), whereas the latter may perceive high prevalence of greenness as pressure to conform to green norms (e.g. Cialdini and Goldstein, 2004). Acting as a norm, high prevalence of greenness is supposed to affect both groups' well-being negatively. Alternatively, however, higher prevalence of greenness may translate into better environmental quality, hence affecting well-being positively.¹

Diversity and polarization may also play a twin role. On the one hand, they may constitute a source of social tension and antagonism, which is supposed to affect well-being negatively (Welsch and Kühling, 2018). On the other hand, more diversity (fragmentation) of green attitudes may mean less pressure to conform to the green norm (for both greens and non-greens), whereas more polarization may provide an opportunity for individuals (both green and non-green) to strengthen their respective identities (Binder et al., 2018). Through these channels, diversity and polarization may affect well-being positively.

Using 73,843 observations for 52,897 individuals from the UK Understanding Society Survey (UKHLS), our fixed effects regressions yield the following main findings: (1) Individuals' subjective well-being, measured as life satisfaction, is positively related to their own green self-image (GSI), even controlling for green behavior. (2) Individuals' life satisfaction is negatively related to the regional-level mean (prevalence) and positively related to the regional-level diversity of greenness, while being unrelated to the degree of polarization of greenness. (3) The

¹ Welsch and Kühling (2018) found the prevalence of greenness at the national level to be positively related to well-being and argued that this may reflect stricter environmental policy and better environmental quality in nations whose citizens have greener preferences. We acknowledge that the policy relevance of regional and national levels of greenness may be different (see Section 4).

well-being benefits from holding a greener self-image are unrelated to the prevalence and diversity of greenness, but positively related to the polarization of greenness (as measured via interactions between GSI and the afore-mentioned measures).

Taking the prevalence and (lack of) diversity as measures of the validity of a greenness norm, result (2) is consistent with the idea that the norm is experienced (by greens) as a standard of reference in the process of green status competition or (by non-greens) as a source of social pressure. Result (3) is consistent with the idea that green self-image yields well-being benefits through identity, that is, by identifying with the own group and differentiating oneself from other groups. These results enhance our understanding of green attitudes as a social norm by providing evidence that when it comes to environmental issues one's own position in relation to others needs to be considered when analyzing potential well-being benefits from going green.

The remainder of the paper is structured as follows: We provide the theoretical background in Section 2, where we present the few existing findings on norms and their interplay with pro-environmental behavior and their potential peer pressure effects for well-being. We then describe our data set in Section 3 and present and discuss results in Section 4. Section 5 concludes.

2. Conceptual Background and Previous Literature

The economic analysis of behavior has seen several extensions of the standard model of decision making. While textbooks in general economics conceive of decision makers as purely self-interested, other-regarding (altruistic) preferences have been recognized in more specialized fields of economics, specifically when it comes to contributions to public goods. In addition, while

the standard model explains economic behavior in terms of the well-being arising from the real-world *consequences* of behaviors, more encompassing models acknowledge that behaviors as well as the underlying attitudes *as such* are associated with more or less individual well-being. The probably most famous example of direct (non-consequential) well-being benefits is the “warm glow of giving” invoked by Andreoni (1990) to explain pro-social behaviors which the consequentialist model is unable to account for. A characteristic feature of these modifications of the standard economic model is that they involve social norms, such as altruism or generosity, and that the direct well-being benefits from behaviors arise from conformity to those norms.²

This section reviews the conceptual background and literature on norms. While this literature (in economics and beyond) is large, our discussion focuses on those aspects that are most relevant in guiding our empirical analysis. The discussion is organized around the following questions: (1) What are norms? (2) How are norms related to subjective well-being? This discussion is followed by a review of pertinent empirical findings.

2.1 What are norms?

When it comes to pro-environmental behavior, norms are widespread: for instance, using plastic bags for shopping, planes to travel for holidays or an SUV for regular commutes are guided partly by norms that define such behavior as socially acceptable or not (Jackson, 2005; Lorenzoni et al., 2007; for a review of how norms influence behaviors see Farrow et al., 2017).

² Akerlof (1980) was the first to analyze the significance of social norms (to which he referred as social customs) for understanding behaviors that standard economic models cannot explain.

But what are norms? A broad definition would be that norms are shared beliefs, which act as vague guides to behavior in actual situations (Schwartz, 1977). Norms can be differentiated along several dimensions. We can distinguish between descriptive and injunctive norms, where descriptive norms inform about “what most people do (what is)” and injunctive norms relate to “what most people approve/disapprove of doing (what ought to be)” (Cialdini et al., 1990; Kallgren et al., 2000; Cialdini and Goldstein, 2004). “What most people do”, for instance taking a shower rather than a bath, has no value significance per se. Yet, by noting the environmental implications, one or the other alternative may become an injunctive norm irrespective of its empirical prevalence.

Norms can further be classified as social and personal norms. Social (injunctive) norms can be defined as shared agreements about what constitutes appropriate and inappropriate behavior (Schultz et al., 2007). They may become personal norms through internalization (Schwartz, 1977). Social norms are often not pursued out of genuine intrinsic motivation, but their effects are mediated by observability and normative expectations (Farrow, 2017), and the latter may imply that they are experienced as coercive.

Finally, it is useful to differentiate between universal and group norms. A universal norm is that of *helping* (Tomasello, 2016). It is referred to as a universal norm because *adherence* to it is not group-specific (whereas the *benefits* from the help may well be restricted to a family, tribe, nation, race, and so on).³ By contrast, group norms are a constitutive element of a social group

³ From an evolutionary perspective, the norm of helping (altruism) has been restricted to within-group beneficiaries. It evolved because within-group altruism offered a group an advantage over other groups, whereas an individual altruist suffered a disadvantage relative to his selfish group-mates (Maynard Smith and Price, 1973).

(Tajfel, 1972). For example, pro-environmental attitudes and behaviors are constitutive for the group of environmentalists (“greens”). Group norms can give rise to a feeling of social identity (see below).

In addition to definitions and classifications of norms, it is important to understand their emergence. Like most economists, Gintis (2009) and Young (2015) consider norms from the point of view of public good problems. They conceive of norms as emergent predispositions within complex adaptive systems, serving as correlating devices that assure prosocial behavior even when such behavior is costly to the individual.⁴ This view is consistent with the evolutionary account of altruism emerging as a trait that endows a group with an evolutionary advantage over other groups even if it puts the altruistic individual at a disadvantage *within* the group (see footnote 3). As will be discussed below, the evolutionary origins of pro-sociality may help understand why a pro-environmental predisposition can be associated with greater subjective well-being independent of actual pro-environmental behavior.

2.2 How are norms related to subjective well-being?

Several motives are usually cited to explain why people follow a social norm, and these motives can be conceived of as channels through which subjective well-being is related to norms and the associated behaviors and attitudes.

People follow a social norm because they want to fit in with relevant peer groups, based on a need for acceptance (searching for conformity), they try to avoid social disapproval or desire

⁴ Indeed, most economic models involving norms are concerned with how norms help induce prosocial behavior. For a review, see Farrow et al. (2017).

the social approval of others, or people just might look for social esteem. In consequence, conformity is one driving mechanism to explain why people act in accordance with social norms (Farrow et al., 2017).

While conformity is a general motivational force for compliance with norms, people are often exposed to several, potentially inconsistent norms. Compliance with one norm or another may thus be a matter of choice, giving rise to what an individual perceives as her social identity. Social identity can be defined as “the individual’s knowledge that he belongs to a certain social group together with some emotional and value significance to him of this group membership” (Tajfel, 1972, p. 292). Due to the “emotional and value significance”, social identity can be a source of well-being.

Importantly, apart from objective parameters that define social groups (e.g. nationality or social status), a constitutive element of some groups are group-specific norms (e.g. Akerlof and Kranton, 2000, 2010). As mentioned above, environmentalists can be conceived of as a social group defined by the norm of environment-friendliness. Adhering to the group norm while at the same time differentiating themselves from competing norms (consumerism, say) endows them with a sense of identity. Similar reasoning may apply to individuals conceiving of themselves as “non-greens” and basing their sense of identity on norms of “wealth” or “possession”, say.

Conformity and identity can thus be considered to be drivers of adherence to social norms. While social identity and conformity to the respective group norms are to some extent a matter of choice (Akerlof and Kranton, 2000, 2010), strong endorsement of competing or majority norms by their adherents may result in conformity pressure. While voluntary conformity to a norm (in

particular: a group norm) may enhance well-being through identity, conformity pressure with respect to a norm not voluntarily adopted may reduce it. In addition, even if a (group) norm is adopted voluntarily, status competition with respect to norm compliance may imply that a norm impacts well-being negatively.

While the conformity and identity benefits discussed in the literature often refer to behaviors (Akerlof and Kranton 2000, 2010), they can likewise arise from the underlying attitudes: As noted above, from an evolutionary point of view an individual's pro-sociality can be understood as an emergent *predisposition* to act pro-socially (e.g. Gintis, 2009). Thus, if pro-sociality emerges as an argument of the utility (well-being) function, this predisposition can be expected to be related to well-being independently of the corresponding behavior. The well-being implications of conformity and identity need thus not necessarily relate to behaviors but may refer to the underlying attitudes and self-images, understood as predispositions.

This discussion suggests that an individual's well-being may depend on her norm-related behaviors and attitudes as well as on the respective norms themselves in several ways. First, being an evolutionarily advantageous trait, pro-sociality (including greenness) can be expected to be positively related to well-being. Second, due to conformity pressure or status competition, the strictness and bindingness of a pro-sociality norm may be negatively related to well-being. Third, being a vehicle for social identity, pro-sociality may impact well-being the stronger the more it allows the individual to differentiate herself from others.

2.3 Previous Findings

Studies on green competitive altruism and green status seeking (Griskevicius et al., 2010; Sexton and Sexton, 2014; Welsch and Kühling, 2016) have highlighted the role of others' behavior by demonstrating that green behavior can be driven by peer group considerations. Norms are associated with various green behaviors, e.g. littering (Kallgren et al., 2000), reduction of car-use (Nordlund and Garvill, 2003) or recycling (Schultz, 1999). The literature here finds a generally positive relationship between green norms and PEB (Thøgersen, 2008; Culiberg and Elgaaied-Gambier, 2016; Farrow et al., 2017).

Green consumption is thus highly influenced by the prevalence of social norms (for a more comprehensive review, see Peattie, 2010). Adhering to green personal norms influences the willingness to reduce personal car use (Nordlund and Garvill, 2003) and can also influence the choice of type of electricity (green vs brown) alongside other, economic factors (Ek and Söderholm, 2008). These norms are often transmitted within the family and also affect adolescents' pro-environmental behavior (Grønhøj and Thøgersen, 2012, 2017). But green norms can conflict with other norms and if, for example, social norms guide people to base their actions on symbolic-affective motives (e.g. cars are status symbol), they can affect PEBs negatively (Steg et al., 2001).

The generally positive relationship between pro-environmental norms and PEB expands also to green self-image. Others' green self-image may be perceived as a norm and it is observable that having a green self-image is related to more pro-environmental decisions and engagement when peer norms are green (Fielding and Hornsey, 2016). This is also shown in McCright and

Dunlap (2011), who analyze attitudinal polarization on global warming. Using data from a 2000 Gallup Poll of 1,004 adults, McCright and Dunlap (2011) show that people of the left wing (political orientation) are more likely to perceive global warming as a reality compared to people from the more right wing and those beliefs have strengthened over the past years. Fielding and Hornsey (2016) argue that similarities within a group and differences between insiders and outsiders of the own group are accentuated, as soon as respective social identities become salient. This leads to an assimilation of attitudes and behaviors of in-group members according to the in-group norms (Fielding and Hornsey, 2016).

Most closely related to our research, Welsch and Kühling (2018) have shown that if being green became a shared social norm in a society, the well-being benefit of a green self-image would increase in the strength of that social norm. It is this relationship that we are interested in in the present paper. While there has been found a positive association between green behavior and subjective well-being (Brown and Kasser, 2005; Jacob et al., 2009; Welsch and Kühling, 2010, 2011; Xiao and Li, 2011; Kasser, 2017; Schmitt et al. 2018; for a discussion see, Welsch 2019), the relationship between (pro-environmental) norms and SWB is not yet well-understood.⁵ While Helliwell (2014) argues that the benefits in terms of SWB due to pro-social behavior in combination with malleable social norms offer a new pathway to more green behavior, and while political actors recognize the impact of norms and use them increasingly as policy tools (Farrow et al., 2017), “the broader welfare impacts of these interventions are at present poorly understood” (p. 6). Especially artificially designed interventions implementing “norms” could also

⁵ SWB has been shown related to the prevalent social norm in other contexts, for instance, unemployed people are unhappier than employed people, but their unhappiness is even greater, the stronger the social norm “to work” is (Stutzer and Lalive, 2004).

be associated with higher costs in terms of welfare. Having a deeper look at the relationship between environmental norms and well-being shows that there is a lack of empirical research so far: acting in accordance with environmental norms can be accompanied by positive feelings (for instance pride) or one can experience negative feelings (such as guilt), in cases where one does not act in accordance with these norms (Steg et al., 2014). Our present work specifically analyzes the extent to which green norms can lead to higher well-being and how this relationship is influenced by individuals' green self-image.

3. Data

Our analysis is based on data from the UK's Understanding Society Survey (UK Household Longitudinal Study, UKHLS) which continues the British Household Panel Survey (BHPS, University of Essex, 2015). It provides a representative survey of UK citizens' attitudes and household characteristics incorporating a wide range of information on respondents' lives. The UKHLS study started in 2009/2010 including 40,000 UK households and roughly 100,000 individuals of at least 16 years of age. These households were selected using multistage random sampling (first by post code and then amongst addresses within these post codes). As a longitudinal study, it tracks

	mean	sd	count
Life satisfaction	5.15	1.50	78466
No. of env. behaviors reported	10.14	1.13	90694
PEBs (sum)	19.50	6.19	90694
Green self image (GSI)	1.67	0.88	78914
GSI high (> 2)	0.14	0.35	98151
GSI low (< 2)	0.36	0.48	98151
Log(gross income, defl.)	7.07	1.26	92325
Disabled (y/n)	0.35	0.48	97983
First degree	0.22	0.42	97839
Higher degree	0.11	0.31	97839
A-level etc.	0.20	0.40	97839
GCSE etc.	0.21	0.41	97839
Other	0.10	0.30	97839
Living as couple	0.11	0.32	98023
Separated	0.02	0.14	98023
Divorced	0.06	0.24	98023
Widowed	0.06	0.24	98023
Single	0.23	0.42	98023
Self employed	0.07	0.26	98134
Unemployed	0.06	0.24	98134
Retired	0.21	0.41	98134
On maternity leave	0.01	0.08	98134
Family care or home	0.06	0.25	98134
Full-time student	0.07	0.26	98134
Lt. sick or disabled	0.04	0.19	98134
Govt training scheme	0.00	0.04	98134
Unpaid, family business	0.00	0.03	98134
On apprenticeship	0.00	0.02	98134
Other	0.01	0.08	98134
No. kids: 1	0.12	0.33	98151
No. kids: 2	0.11	0.31	98151
No. kids: 3+	0.05	0.22	98151
Age	46.46	18.40	98151
Year dummy (2012/13)	0.48	0.50	98151
gor_dv==1. North East	0.04	0.19	98122
gor_dv==2. North West	0.10	0.30	98122
gor_dv==3. Yorkshire and the Humber	0.08	0.27	98122
gor_dv==4. East Midlands	0.08	0.26	98122
gor_dv==5. West Midlands	0.08	0.28	98122
gor_dv==6. East of England	0.09	0.28	98122
gor_dv==7. London	0.14	0.35	98122
gor_dv==8. South East	0.12	0.32	98122
gor_dv==9. South West	0.08	0.27	98122
gor_dv==10. Wales	0.06	0.24	98122
gor_dv==11. Scotland	0.08	0.27	98122
gor_dv==12. Northern Ireland	0.05	0.22	98122
Female (y/n)	0.54	0.50	98151
Observations	98151		

Table 1: Summary statistics.

individuals over the years and comprises now seven waves collected so far. The data set contains a wealth of information on socio-demographic characteristics and tracks individuals' environmental behavior and attitudes as well as self-reports of subjective well-being.

For our study, we draw on waves 1 and 4 of the UKHLS (corresponding to years 2009/2010 and 2012/2013), which are the only waves during which a number of questions about environmental behavior and green self-image have been elicited. After deletion of observations with missing values in the questions of interest, our sample size drops from 98,000 to roughly 78,000 responses from over 50,000 distinct individuals. Summary statistics for the following variables of interest are depicted in Table 1.

Our dependent variable is subjective well-being measured by a life satisfaction question as follows: "Please tick the number which you feel best describes how dissatisfied or satisfied you are with the following aspects of your current situation... Your life overall". Respondents can answer on a seven-point numerical end-point labelled scale ranging from "completely dissatisfied" (1) to "completely satisfied" (7). Such questions have been shown to be valid and reliable (Lucas, 2018).⁶ Mean life satisfaction is 5.15 (with a sd of 1.5).

Our main independent variables of interest are individuals' green behaviors and green self-image as well as aggregated values of these that provide societal norms and reference levels. Green behaviors are elicited in the UKHLS via 11 questions seeking answers to what extent

⁶ While the variable would strictly speaking necessitate the estimation of an ordered response model, consensus has emerged in the literature that it can be usefully treated as cardinal and that the gains from using a fixed effects OLS approach, i.e. being able to control for individual-specific factors such as personality traits or response styles, outweigh the drawbacks from assuming life satisfaction to be cardinal (Ferrer-i-Carbonell and Frijters, 2004).

individuals act pro-environmentally: “Now a few questions about the environment. Please look at this card and tell me how often you personally do each of the following things”: “Switch off lights in rooms that aren’t being used”; “Put more clothes on when you feel cold rather than putting the heating on or turning it up”; “Decide not to buy something because you feel it has too much packaging”; “Buy recycled paper products such as toilet paper or tissues”; “Take your own shopping bag when shopping”; “Use public transport (e.g. bus, train) rather than travel by car”; “Walk or cycle for short journeys less than 2 or 3 miles”; “Car share with others who need to make a similar journey”; “Take fewer flights when possible”; “Leave your TV on standby for the night”; “Keep the tap running while you brush your teeth”. Respondents can answer these on a 6-point Likert-type scale (from 1 = “always”, to “very often”, “quite often”, “not very often” to 5 = “never” and 6 = “not applicable, cannot do this”; for some of these questions, the scale was reverse-coded in the questionnaire). We have consistently recoded the answers to range from 0 to 4 so that higher values represent higher levels of pro-environmental behavior. We have also recoded the answer “not applicable” to “missing” so that the mean values in our summary statistics table (see Table 1) reflect the mean level of environmentally-friendly behavior of those who are rating this behavior as applicable. Actual participation in these behaviors varies strongly, potentially depending on time or monetary cost of these behaviors. The behaviors are applicable to most individuals (average number reported as applicable is 10.14).

In line with the analysis in Binder and Blankenberg (2017), we aggregate these individual behaviors into a sum index of pro-environmental behaviors (PEBsum) by summing up the intensity of individual green behaviors (mean 19.5, sd 6.19).⁷

For green self-image (GSI), we draw on a “green lifestyle question”, where respondents are being asked to rate how they would describe their overall lifestyle with regard to environmental

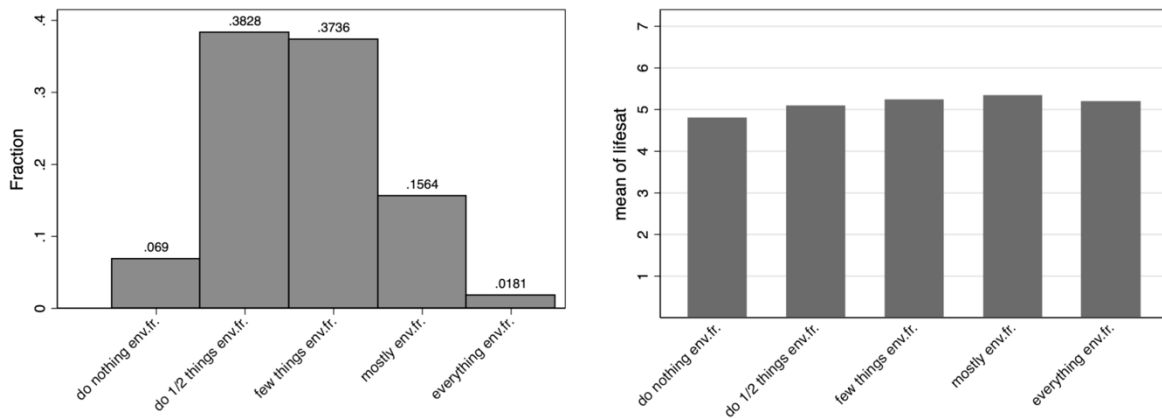


Figure 1: Green self-image (left), life satisfaction by GSI (right)

friendliness. Individuals respond to the question “[W]hich of these would you say best describes your current lifestyle?” on a five-point Likert-scale with answer going from “I don’t really do anything that is environmentally-friendly” (1, our base category), “I do one or two things that are environmentally-friendly” (2), “I do quite a few things that are environmentally-friendly” (3), “I’m environmentally-friendly in most things I do” (4) up to “I’m environmentally-friendly in everything I do” (5), which we recode to range from 0 to 4. We interpret this question as a global summary judgment of how green the respondents judge their behaviors. Due to its global nature and its

⁷ To check the robustness of our results with regard to index construction, we also use a mean behavior index (PEBmean), where we divide the sum of intensities by the sum of applicable behaviors (mean PEBmean 1.94, sd 0.63). Both indices are strongly correlated ($r=.92^{***}$) and results do not change much with index choice, so that we focus on the sum index in the following.

much less than perfect correlation with the behavior variables, we argue however that this is rather a measure (proxy) of green self-image rather than an accurate summary of actual individual behavior. Mean GSI over the full sample is 1.67 (sd 0.88). Figure 1 shows the distribution of the GSI variable (left panel) as well as life satisfaction scores depending on green self-image (right panel). We can see that only a few people consider themselves to be extremely environmentally-friendly (2%) or unfriendly for that matter (7%), whereas most do one or two or a few things in an environmentally friendly way (38% and 37% respectively). Life satisfaction increases in green identity, with a dip for the highest category. Disaggregating by the two panel years used (Figure 2) we can see that most variation is not on the extremes, but a slight shift from doing one or two things towards doing a few things for the environment. Mean green self-image over the full sample changes from 1.65 to 1.70 during our panel horizon, whereas the PEBsum index changes from 20.12 to 18.82 between the two years. For the analyses to follow, we collapse GSI into two dummies for high ($GSI > 2$) and low ($GSI < 2$) green self-image, making the middling category of “doing few things environmentally-friendly” our base category.

To explore the effects of green norms and reference levels, we compute a set of variables separately for both GSI and green behavior that measure regional prevalence (PREV) as well as regional diversity (FRAC) and polarization (POLAR). As measure of prevalence of green behavior and of green self-image, we simply use the regional mean levels of both variables. As measures of diversity and polarization, we compute regional fractionalization and polarization measures of both. To measure fractionalization, we compute the Rao’s quadratic entropy (Rao, 1982), a measure quite similar to the well-known Gini coefficient. As with the Gini coefficient, higher values indicate a higher attitude diversity. As measure of polarization, we use Esteban and Ray’s

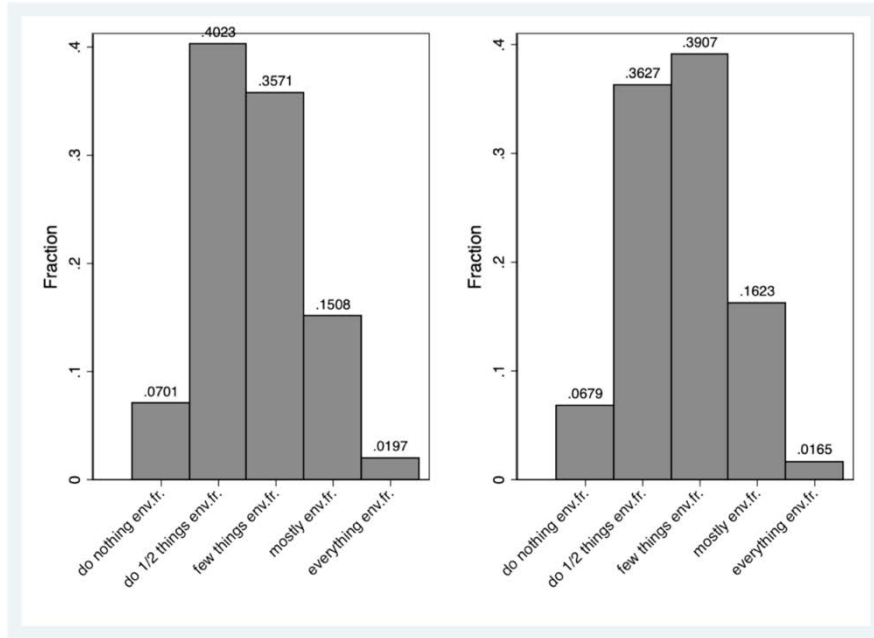


Figure 2: Green self-image in both panel years.

(1994) measure, which additionally takes into account the size of the group to which an individual belongs and is closer to unity the more polarized a society is with regard to an attitude or a behavior (a more detailed discussion of these measures is given in Montalvo and Reynal-Querol, 2005). Both measures interpret attitudinal distance in a Euclidean way. Table 2 shows descriptive statistics for our diversity measures on the regional level (we compute those measures on the level of the UK's twelve government office regions per year).

	(1) overall				(2) 2009/2010				(3) 2012/2013			
	mean	sd	min	max	mean	sd	min	max	mean	sd	min	max
PEBs (sum)	19.505	6.186	0	44	20.125	6.323	0	44	18.821	5.956	0	44
Mean PEB (year, region)	19.514	1.271	16.30	22.17	20.135	1.085	17.84	22.17	18.843	1.106	16.30	21.06
Green self image (GSI)	1.672	0.883	0	4	1.648	0.888	0	4	1.697	0.878	0	4
Mean GSI (year, region)	1.670	0.058	1.525	1.778	1.647	0.045	1.573	1.724	1.696	0.060	1.525	1.778
Rao GSI (year, regional)	0.236	0.016	0.211	0.262	0.241	0.016	0.216	0.261	0.232	0.015	0.211	0.262
POLAR GSI (year, region)	0.260	0.002	0.257	0.265	0.262	0.002	0.259	0.265	0.259	0.002	0.257	0.262
Observations	98151				50994				47157			

Table 2: Measures of diversity.

Finally, our control variables comprise the set of usual suspects in subjective well-being studies, including variables containing personal and socio-demographic information about the respondents. We use information about gross monthly income (deflated to 2015 GBP), age (the mean age of the respondents is 46 years with a standard deviation of 18 years), age² (divided by 100) and marital status. For the latter, the question about the “de facto marital status” has been recoded into six categories (“married”, “living as couple”, “separated”, “divorced”, “widowed” and “single”). We also include dummy variables for different levels of education (“1st degree”, “other higher degree”, “A-level, etc.”, “GCSE, etc.”, “other qualification” and “none” being our base category), job status, an objective measure of health (being disabled), number of children (coded as a categorical variable, 1,2 or 3+ children), and regional dummies (for government office regions). As the environmental variables of interest are only available in two waves/years (namely year 2009/2010 as well as 2012/2013), we also created a dummy variable for the later period (wave 4).

	Life satisfaction	Green self image (GSI)	PEBs (sum)	Log(gross income, defl.)	Disabled (y/n)	Age	Female (y/n)
Life satisfaction	1.00						
Green self image (GSI)	0.08*** (0.0000)	1.00					
PEBs (sum)	0.04*** (0.0000)	0.29*** (0.0000)	1.00				
Log(gross income, defl.)	0.01* (0.0220)	-0.01* (0.0132)	-0.04*** (0.0000)	1.00			
Disabled (y/n)	-0.15*** (0.0000)	0.05*** (0.0000)	-0.02*** (0.0000)	-0.03*** (0.0000)	1.00		
Age	0.04*** (0.0000)	0.19*** (0.0000)	0.04*** (0.0000)	0.06*** (0.0000)	0.34*** (0.0000)	1.00	
Female (y/n)	-0.00 (0.9656)	0.04*** (0.0000)	0.09*** (0.0000)	-0.14*** (0.0000)	0.02*** (0.0000)	0.00 (0.5468)	1.00
Observations	98151						

p-values in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3: Correlation table (Pearson).

Table 3 shows bivariate (Pearson) correlations with no problems of multicollinearity apparent (the diversity measures are also correlated below the usual thresholds, not shown here). Green variables are positively related to life satisfaction, as is income, whereas bad health is

negatively related to life satisfaction. Age and being female is positively related to all green variables and income shows a negative association in our sample.

4. Results and discussion

4.1 Results

We estimate FE OLS models, including year and regional dummies and clustering standard errors on the individual level. Our results are depicted in Table 4, where we have created dummy variables for low (doing nothing or 1 or 2 things environmentally-friendly) and high levels of green self-image (being mostly or fully environmentally-friendly), with doing “few things environmentally-friendly” as baseline category. Low own green self-image is negatively associated with subjective well-being in our models and high own green self-image positively so, with the latter coefficient twice the size (column 1). Green behavior is never significantly related to subjective well-being and its coefficient is small for a one unit-increase in green behavior intensity (these results have been reported and discussed in Binder and Blankenberg, 2017).

The main contribution of our present analysis is how one’s peer’s green self-image influences one’s well-being gain/loss from own green self-image. In our second model (column 2), we add a variable for the mean green self-image (on a regional level), i.e. a proxy for the prevalence of a strong green norm, where many people consider themselves environmentally-friendly. This measure of strength of a green norm is negatively related to individuals’ life satisfaction (independent of one’s own green self-image, whose coefficient sizes remain unchanged). While a coefficient for a one-unit change of prevalence of green self-image of $b=-1.02^{**}$ may seem big, the mean level between the two panel waves changed by 0.05 units, so

that the loss in life satisfaction of this change is $-1.02 \times 0.05 = 0.051$, about the size of well-being loss one has from having a low level of green self-image. Interacting the prevalence variable now with own green self-image (column 3) shows no significant interaction effects, i.e. the negative effect of overall average green self-image on own well-being does not depend on whether one is green or not. Note also that the main effect of prevalence ($b = -.91^*$) is slightly smaller in the interacted model for the baseline category (i.e. at own green self-image at baseline level of doing a few green things). The main effect for high own green self-image absent (regional) green norms

	(1) GSI		(2) PREV(GSI)		(3) GSI*PREV(GSI)		(4) DIV(Rao)		(5) GSI*DIV(Rao)		(6) POLAR(ER)		(7) GSI*POLAR(ER)	
GSI low (< 2)=1	-0.05*	(-2.40)	-0.05*	(-2.48)	-0.08	(-0.15)	-0.05*	(-2.44)	-0.30	(-1.02)	-0.05*	(-2.37)	-4.25*	(-1.99)
GSI high (> 2)=1	0.10***	(3.71)	0.10***	(3.72)	1.30+	(1.78)	0.10***	(3.67)	-0.35	(-0.90)	0.10***	(3.67)	-6.97*	(-2.45)
Mean GSI (year, region)			-1.02**	(-3.11)	-0.91*	(-2.45)								
Rao GSI (year, regional)							3.73**	(2.80)	2.93*	(1.96)				
POLAR GSI (year, region)											3.39	(0.29)	-9.12	(-0.73)
GSI low (< 2)=1 x Mean GSI (year, region)					0.02	(0.05)								
GSI high (> 2)=1 x Mean GSI (year, region)					-0.72	(-1.64)								
GSI low (< 2)=1 x Rao GSI (year, regional)									1.04	(0.84)				
GSI high (> 2)=1 x Rao GSI (year, regional)									1.92	(1.16)				
GSI low (< 2)=1 x POLAR GSI (year, region)													16.13*	(1.96)
GSI high (> 2)=1 x POLAR GSI (year, region)													27.21*	(2.48)
PEBs (sum)	0.00	(1.52)	0.00	(1.54)	0.00	(1.52)	0.00	(1.53)	0.00	(1.52)	0.00	(1.52)	0.00	(0.06)
Log(gross income, defl.)	0.00	(0.05)	0.00	(0.07)	0.00	(0.08)	0.00	(0.02)	0.00	(0.04)	0.00	(0.01)	0.00	(0.06)
Disabled (y/n)	-0.13***	(-5.25)	-0.13***	(-5.28)	-0.13***	(-5.30)	-0.12***	(-5.14)	-0.12***	(-5.15)	-0.12***	(-5.12)	-0.12***	(-5.16)
First degree	-0.14	(-0.73)	-0.14	(-0.71)	-0.14	(-0.73)	-0.15	(-0.75)	-0.15	(-0.75)	-0.15	(-0.77)	-0.14	(-0.74)
Higher degree	-0.29	(-1.46)	-0.29	(-1.45)	-0.29	(-1.46)	-0.30	(-1.50)	-0.30	(-1.50)	-0.30	(-1.52)	-0.30	(-1.51)
A-level etc.	-0.10	(-0.57)	-0.10	(-0.56)	-0.10	(-0.57)	-0.11	(-0.61)	-0.11	(-0.62)	-0.11	(-0.62)	-0.10	(-0.58)
GCSE etc.	-0.16	(-0.97)	-0.16	(-0.95)	-0.16	(-0.96)	-0.17	(-1.03)	-0.17	(-1.03)	-0.18	(-1.04)	-0.17	(-1.03)
Other	-0.03	(-0.19)	-0.03	(-0.19)	-0.03	(-0.20)	-0.07	(-0.40)	-0.07	(-0.40)	-0.07	(-0.39)	-0.06	(-0.36)
Living as couple	0.12*	(2.04)	0.11*	(2.01)	0.11*	(2.03)	0.12*	(2.05)	0.12*	(2.05)	0.12*	(2.07)	0.12*	(2.07)
Separated	-0.20*	(-1.97)	-0.20*	(-2.00)	-0.20*	(-1.99)	-0.18+	(-1.83)	-0.18+	(-1.82)	-0.18+	(-1.81)	-0.18+	(-1.78)
Divorced	-0.01	(-0.12)	-0.01	(-0.09)	-0.01	(-0.08)	-0.00	(-0.02)	-0.00	(-0.01)	-0.00	(-0.04)	-0.00	(-0.02)
Widowed	-0.27*	(-2.44)	-0.28*	(-2.47)	-0.27*	(-2.46)	-0.27*	(-2.42)	-0.27*	(-2.41)	-0.27*	(-2.39)	-0.27*	(-2.38)
Single	-0.09	(-1.21)	-0.09	(-1.23)	-0.09	(-1.21)	-0.09	(-1.23)	-0.09	(-1.22)	-0.09	(-1.23)	-0.09	(-1.22)
Self employed	0.17**	(3.28)	0.17***	(3.31)	0.17***	(3.32)	0.17**	(3.24)	0.17**	(3.25)	0.17**	(3.22)	0.17**	(3.26)
Unemployed	-0.33***	(-5.58)	-0.33***	(-5.55)	-0.33***	(-5.56)	-0.34***	(-5.80)	-0.34***	(-5.80)	-0.34***	(-5.82)	-0.34***	(-5.77)
Retired	0.06	(1.11)	0.06	(1.15)	0.06	(1.15)	0.05	(1.00)	0.05	(1.00)	0.05	(0.98)	0.05	(1.06)
On maternity leave	0.27**	(2.98)	0.27**	(3.00)	0.27**	(3.00)	0.27**	(2.99)	0.27**	(2.99)	0.27**	(2.99)	0.27**	(3.00)
Family care or home	-0.02	(-0.36)	-0.02	(-0.33)	-0.02	(-0.34)	-0.02	(-0.26)	-0.02	(-0.26)	-0.02	(-0.27)	-0.01	(-0.25)
Full-time student	0.03	(0.32)	0.02	(0.30)	0.02	(0.28)	0.03	(0.42)	0.03	(0.42)	0.04	(0.44)	0.04	(0.44)
Lt. sick or disabled	-0.62***	(-6.88)	-0.62***	(-6.88)	-0.62***	(-6.89)	-0.63***	(-6.93)	-0.63***	(-6.93)	-0.63***	(-6.94)	-0.62***	(-6.91)
Govt training scheme	-0.06	(-0.17)	-0.07	(-0.20)	-0.07	(-0.20)	-0.07	(-0.20)	-0.07	(-0.22)	-0.06	(-0.18)	-0.08	(-0.23)
Unpaid, family business	0.21	(0.56)	0.20	(0.55)	0.20	(0.53)	0.20	(0.54)	0.19	(0.52)	0.20	(0.55)	0.19	(0.52)
On apprenticeship	0.31	(0.97)	0.31	(0.97)	0.31	(0.97)	0.31	(0.95)	0.31	(0.95)	0.32	(0.99)	0.34	(1.06)
Other	0.05	(0.35)	0.05	(0.35)	0.05	(0.37)	0.05	(0.35)	0.05	(0.37)	0.05	(0.35)	0.05	(0.39)
No. kids: 1	0.04	(1.03)	0.04	(1.03)	0.04	(1.04)	0.04	(0.98)	0.04	(0.98)	0.04	(0.97)	0.04	(0.99)
No. kids: 2	0.02	(0.30)	0.01	(0.28)	0.02	(0.30)	0.01	(0.25)	0.01	(0.26)	0.01	(0.25)	0.02	(0.30)
No. kids: 3+	0.15+	(1.95)	0.15+	(1.93)	0.15+	(1.95)	0.15+	(1.89)	0.15+	(1.91)	0.15+	(1.91)	0.15+	(1.92)
Age	0.05	(1.07)	0.05	(1.04)	0.04	(0.98)	0.05	(1.05)	0.05	(1.03)	0.05	(1.06)	0.05	(1.01)
Age ² /100	-0.03*	(-2.09)	-0.02*	(-1.98)	-0.02+	(-1.75)	-0.03*	(-2.05)	-0.03*	(-1.99)	-0.03*	(-2.05)	-0.02+	(-1.86)
Year dummy (2012/13)	-0.30*	(-2.29)	-0.25+	(-1.88)	-0.25+	(-1.88)	-0.26*	(-2.00)	-0.26*	(-2.01)	-0.29*	(-2.14)	-0.29*	(-2.19)
gor_dv=1. North East	0.36	(1.00)	0.33	(0.91)	0.32	(0.90)	0.39	(1.08)	0.39	(1.07)	0.37	(1.02)	0.35	(0.96)
gor_dv=2. North West	0.15	(0.69)	0.15	(0.73)	0.15	(0.70)	0.20	(0.93)	0.20	(0.93)	0.16	(0.74)	0.15	(0.69)
gor_dv=3. Yorkshire and the Humber	0.07	(0.30)	0.04	(0.17)	0.03	(0.13)	0.08	(0.35)	0.08	(0.34)	0.07	(0.30)	0.06	(0.25)
gor_dv=4. East Midlands	0.07	(0.36)	0.10	(0.52)	0.10	(0.50)	0.14	(0.72)	0.14	(0.71)	0.08	(0.39)	0.07	(0.34)
gor_dv=5. West Midlands	0.29	(1.44)	0.29	(1.39)	0.28	(1.37)	0.34	(1.63)	0.33	(1.62)	0.30	(1.47)	0.30	(1.43)
gor_dv=6. East of England	-0.08	(-0.51)	-0.02	(-0.14)	-0.02	(-0.15)	0.05	(0.35)	0.05	(0.34)	-0.06	(-0.40)	-0.08	(-0.49)
gor_dv=8. South East	0.02	(0.11)	0.08	(0.55)	0.08	(0.54)	0.17	(1.13)	0.17	(1.10)	0.03	(0.22)	0.02	(0.13)
gor_dv=9. South West	0.10	(0.52)	0.19	(1.01)	0.19	(0.99)	0.25	(1.25)	0.24	(1.23)	0.11	(0.58)	0.10	(0.49)
gor_dv=10. Wales	0.53+	(1.72)	0.62*	(1.97)	0.62*	(1.98)	0.62*	(1.97)	0.61+	(1.96)	0.54+	(1.74)	0.53+	(1.69)
gor_dv=11. Scotland	-0.26	(-0.93)	-0.28	(-1.02)	-0.28	(-1.03)	-0.21	(-0.77)	-0.22	(-0.79)	-0.24	(-0.85)	-0.26	(-0.93)
gor_dv=12. Northern Ireland	0.75*	(2.40)	0.67*	(2.21)	0.68*	(2.23)	0.78*	(2.56)	0.78**	(2.58)	0.76*	(2.45)	0.74*	(2.53)
Constant	3.72+	(1.85)	5.41**	(2.59)	5.28*	(2.49)	2.80	(1.37)	2.99	(1.47)	2.84	(0.77)	6.22	(1.63)
Observations	74179		74179		74179		73843		73843		73843		73858	
R ²	0.031		0.031		0.032		0.031		0.031		0.031		0.031	
F	15.07		14.99		14.39		14.75		14.13		14.57		14.30	
df_r	53095.00		53095.00		53095.00		52896.00		52896.00		52896.00		52907.00	
r2_a	0.03		0.03		0.03		0.03		0.03		0.03		0.03	

t statistics in parentheses

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: Regression Table. Dummies for high/low green identity.

is barely significant but strongly positive ($b=1.30+$), i.e. well-being benefits of own green self-image are highest when no one else identifies as green, which supports the idea of well-being benefits gained by distinguishing oneself from a prevailing norm. The fact that prevalence of green self-image is negative for all levels of own green self-image points either to an explanation that individuals perceive prevailing green norms as exerting pressure: if one is not conforming with green norms (i.e. own green self-image low) this could be construed as conformity pressure (Cialdini and Goldstein, 2004), whereas for high green identity individuals, this negative effect could come through the channel of high peer pressure to do more (Welsch and Kühling, 2016) or alternatively through not allowing for being distinct from others (something we cannot distinguish with the data at hand). A similar negative role of prevalence of other's attitudes has also been found for political party support in the UK (Binder, 2018).

We have further explored how different levels of cohesiveness of societal norms can moderate the well-being gain from own green self-image by also computing measures of green self-image diversity (columns 4 and 5) as well as green self-image polarization (columns 6 and 7). For diversity, we find a significant and positively signed association ($b=3.73^{**}$), and no interaction effects with our measure of well-being. The diversity measure has decreased by 0.009 units between our two sample years, which amounts to a 0.034 ($=3.732*0.009$) point decrease in life satisfaction, a bit more than two-thirds of the effect a low green self-image has on life satisfaction in our first model). That prevalence is negatively associated with well-being and diversity of regional green norms positively so is consistent with our above explanation of conformity pressures: the more diverse the environment with regard to green norms, the less pressure an

individual may feel to conform to some green norm and hence the higher one's well-being both on the upper and lower end of the greenness distribution.

This interpretation is further bolstered by looking into the association between polarization and well-being (column 6 and 7), where higher levels of polarization also positively impact on subjective well-being *for the extremes* of the distribution. While the coefficient for the ER polarization measure is nonsignificant in both models (6) and (7), the interacted model (7) shows positive interaction terms for both the high and low green self-image respondents. With highly polarized green vs. non-green norms, individuals may seem to be better able to strengthen their own respective identities and feel less pressure to conform to a prevailing attitude. For the interacted polarization model (column 7), we can also see that the main effect for both extremes of own green self-image (at complete absence of polarization) is negative. This is offset through increasing polarization such that taking extreme green/non-green positions is beneficial for subjective well-being if polarization is greater than 0.263 (= 4.25/16.13) and 0.256 (= 6.97/27.21), respectively (which is close to the mean value of polarization).

4.2 Discussion

While there have not been many studies exploring the effects of pro-environmental attitude and norms diversity and polarization on subjective well-being, it is instructive to compare our results to the one study that has explored such effects, albeit on a cross-national level. Welsch and Kühling (2018) found significant well-being benefits from being green, which were smaller in societies in which the distribution of green self-image is characterized by more disparity. More specifically, they found that interactions between own green self-image and measures of both diversity (fractionalization) and polarization were negative over their sample of European

countries. Taking attitude disparity as an inverse measure of the validity of a green social norm, they interpreted their results as suggesting that part of the well-being benefit from being green derives from adherence to that norm, a finding that is opposite to what we find in a one-country and regional-level analysis. In the current setting, well-being benefits of being green are independent of the diversity of green attitude but increasing in polarization. In addition, in models without interactions, Welsch and Kühling (2018) found well-being to be positively related to national mean greenness and negatively related to national-level diversity and polarization of greenness, whereas the current paper finds the opposite with respect to mean and diversity and an insignificant relationship between well-being and polarization.

We cannot rule out that such a divergence of findings comes from using different methodological approaches. While the above mentioned analysis used country-fixed effects, we here use person-fixed-effects regressions, thus controlling for time-invariant confounders at the individual as well as regional level (e.g. demographic structure, climate etc.).⁸ Furthermore, in this paper, we control for actual green behavior. But there are also a number of substantive reasons that could explain the different findings:

First, one can consider national mean GSI as a proxy for stricter environmental policy and better environmental quality (regressions control for possible “costs” in terms of growth and unemployment). Regional GSI levels may be less policy-relevant but more salient as a standard for social comparison.⁹ Secondly, assuming a greater policy relevance of national as opposed to

⁸ Using pooled cross-section regressions instead would involve the risk of omitted variable bias due to such confounders.

⁹ The next section elaborates on the issue of salience.

regional GSI, the aspect of social tension and antagonism, captured by the polarization measure, may be more relevant in a cross-national than in a cross-regional framework: green policy is then more a contested issue within nations, but not within regions. Third, interaction effects on a national level suggest that greens suffer more from tension and antagonism than do non-greens because they may be more committed to their cause and hence more frustrated if this is not universally shared. Again, this is less relevant when the policy relevance of green attitudes is lower on a regional level. In the latter case, our results suggest that greater polarization enables not only greens but also non-greens to derive well-being benefits from their attitudes through strengthening their respective sense of identity.

While these potential explanations should receive further attention in future research and both more national-level as well as cross-national level research on disparity effects of green attitudes on subjective well-being seems desirable, one value-added of this paper is thus to contribute to clarifying the role of the prevalence and distribution of green attitudes at different societal levels. As research findings on attitude disparity effects on subjective well-being show, those effects depend both on the relevant societal levels where attitudes are relevant but also on the type of attitude analyzed, with different dynamics at play when it comes to pro-environmental (Welsch and Kühling, 2018) or otherwise political attitude disparity (Welsch and Kühling, 2017; Binder, 2018).

5. Conclusion

While traditional economic analysis has explained economic behavior in terms of the well-being arising from the real-world *consequences* of behaviors, more encompassing models acknowledge

that behaviors as well as the underlying attitudes *as such* are associated with more or less (subjective) well-being. Such direct well-being benefits from behaviors and attitudes may arise from conformity to internal (moral) or external (social) norms. The “warm glow of giving” that has been invoked to explain pro-social and pro-environmental behaviors, which the consequentialist model is unable to account for, is a salient example, where the relevant norms may be referred to as altruism or generosity.

Social norms range from those that claim universal acceptance to others that are specific to more narrowly defined social groups. Adherence to group norms (at various sub-universal levels) contributes to individuals’ social identity. By allowing individuals to identify with a certain group and to differentiate themselves from other groups, voluntary adherence to group norms is conducive to feelings of belonging and as such is a source of well-being. On the other hand, however, group norms may be experienced as coercive, potentially creating conformity pressure and reducing well-being.

Tying in with a small number of pertinent studies the present paper has studied the relationship between holding a green self-image – a potentially identity-relevant group norm - and life satisfaction in the UK. Focusing on (sub-national) regions as the unit of reference, the paper has investigated if and how the individual-level greenness-satisfaction relationship varies with measures of the prevalence and distribution of greenness at the regional level, taking these measures as indicators of a green social norm.

Two key findings emerged from our analysis. First, life satisfaction is negatively related to the regional-level mean (prevalence) and positively related to the regional-level diversity of

greenness, while being unrelated to the degree of polarization of greenness overall. Taking the prevalence as a direct and diversity as an inverse measure of the validity of a greenness norm, these results are consistent with the idea that the norm is experienced (by greens) as a standard of reference in the process of green status competition or (by non-greens) as a source of social pressure.

Second, as shown in an interaction analysis, the well-being benefits from holding a greener self-image are unrelated to the prevalence and diversity of greenness, but positively related to a measure of polarization of greenness. This is consistent with the idea that green self-image yields well-being benefits through identity, that is, by identifying with the own group and differentiating oneself from other groups – a possibility that necessarily relies on and is enhanced by sufficiently large differentiation/polarization of groups. This interpretation is further bolstered by the finding that greater polarization of environment-related attitudes is associated with well-being benefits not only of holding a green but also of holding a non-green self-image.

The findings with respect to the regional-level prevalence, diversity, and polarization of green self-image are in stark contrast to findings at a cross-national level. In such a setting it was found that the well-being benefits of being green are greater when there is *less* disagreement (diversity and polarization) on environmental issues, that is, when being green is a shared national norm rather than being contested.

As discussed above, one way of reconciling the opposing findings is by noting that the prevalence and disparity of greenness at the national level possess greater policy relevance, which may induce additional channels through which well-being is related to measures of

individual and societal greenness. Measures of the prevalence and disparity of greenness at the regional level, conversely, may be more salient from the point of view of social norms. Specifically, within-region diversity or polarization (by definition) means that greens find like-minded individuals in their region with whom they can share a common identity – as do non-greens. Nation-wide diversity/polarization, by contrast, means there are like-minded people *somewhere*, but they may be too dispersed to provide the benefits of a common identity. Similarly, regional prevalence of greenness arguably is more salient as a standard of reference for own greenness than is nation-wide prevalence.

While our study is amongst the very first to illuminate the well-being effects of environmental norms, it is not without limitations: first, we measure green norms and green identity only very indirectly and with a coarse measure of green self-image. Future work here should aim at validating our findings by using different measures for green norms. Second, our data set has been quite limited by offering only two waves of data, spaced four years apart. While panel data always seems preferable to cross-sectional observational data to account for unobserved (time-invariant) factors, it might be helpful to assess changes in green norms and their prevalence and disparity effects on subjective well-being for shorter time periods. Third, owing to the lack of coherent theoretical framework on the norm effects on subjective well-being (both positive and negative effects are conceivable, either through pressure or a potential strengthening of own identity), our findings so far are exploratory and await further confirmation. Further research should both include within-country analyses (where green self-image reports can reasonably be assumed to reflect a coherent norm) as well as between-country analyses to validate the green self-image measure as being reflective of similar norms (and to allow to

disentangle green norm effect from actual green behavior and the state of the environment in those respective countries).

These limitations will provide fruitful avenues for further research. Looking into the well-being effects of norms is highly timely when policy-makers already explore the possibility to influence the transition to a greener economy by shaping green norms or nudging consumers towards more environmentally-friendly behaviors (e.g., Farrow et al., 2017). Selling pro-environmental behavior as something that makes people happy despite having to curb down on consumption seems to have become a prominent rhetorical tool within such a political agenda, but failing to take into account the above-analyzed norm effects might seriously mislead policy-making. Pointing out to consumers their happiness gain from green behavior might ultimately be self-defeating as policy tool if increasing levels of green behavior successively decrease such a well-being gain for the individual through increased peer pressure and lack of potential to differentiate oneself from others.

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