

**Self-Construals and Environmental Values in 55 Cultures**

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**Highlights:**

Past research has noted similarities between self–other and self–nature relations

We report correlations among seven self-construal dimensions and environmental values

Cross-cultural findings confirmed reliable interdependence–environmentalism relations

Greater connection and commitment to others linked to environmental values

Consistency versus variability was the only independent pole with positive correlation

### **Abstract**

Environmentalism is influenced by views of the self. In past research, individuals who saw themselves as more interdependently connected to others expressed greater environmental concern than those who saw themselves as more independent from others. Yet, cross-cultural evidence is limited. In this pre-registered study, we tested how seven ways of being interdependent or independent correlated with environmental values among 7,279 members of 55 cultural groups from 33 nations. Supporting our predictions, environmental values were strongly associated with several forms of interdependent self-construal, supporting parallels between self–other and self–nature relations. Specifically, two interdependent forms of self-construal showed consistent cross-cultural correlations: those who saw themselves as more connected to others and those who emphasized commitment to others above self-interest were more likely to endorse the value of looking after the environment. Extending previous conceptions, one way of being independent correlated consistently with environmental values: those who saw themselves as consistent across contexts were also more likely to endorse environmental values. Multilevel moderation analysis indicated that commitment to others had stronger correlations with environmental values in nations with greater environmental performance and national development. We conclude that improving social connectedness and cohesion, alongside the protection of natural ecosystems, may be imperative for tackling the global climate crisis.

**Keywords:** self-construal; environmentalism; environmental values; cross-cultural

## Introduction

The study of human–nature interactions has become an important topic as human impacts on the global ecosystem have become untenable (e.g., Gifford, 2014; Schultz, 2002; Soga & Gaston, 2016). Whilst awareness of environmental issues appears to be increasing (Leiserowitz, Maibach, Roser-Renouf, Feinberg, & Rosenthal, 2018; Milfont, Wilson, & Sibley, 2017), apathy towards environmental degradation continues to be widespread (Bengston et al., 2019), inhibiting the development of a global sustainability movement. Hence, understanding why some people are more concerned about environmental issues than others has become an important question for environmental psychologists (Schultz, 2001; Stern, Dietz, & Kalof, 1993). An enduring theme across academic disciplines has been the claim that apathy towards environmental degradation is a consequence of modern human–nature relations, as humans have become increasingly disconnected from their natural environments (Kellert & Wilson, 1995; Schultz, 2002; Soga & Gaston, 2016), presenting a significant obstacle for developing sustainable societies.

In 2002, Schultz formalized this idea into a psychological framework for understanding human–nature relations, in which he argued that one’s commitment to protect nature stems from one’s emotional and cognitive connection to nature. In almost two decades since, several measures have been developed to assess nature connectedness (e.g., Mayer & Frantz, 2004; Schultz, 2001), which has led to a flourishing body of research linking connection to nature with pro-environmental behaviour (for meta-analytical reviews, see Mackay & Schmitt, 2019; Whitburn, Linklater, & Abrahamse, 2020). Schultz’s framework for human–nature relations was modelled from social psychological research on human relationships, highlighting the similarities between self–other and self–nature relations. Hence, environmental psychologists have suggested that self–other relations may also be important for understanding environmental attitudes and behaviours (Arnocky, Stroink, &

DeCicco, 2007; Komatsu, Rappleye, & Silova, 2019), as those who are more connected to others will be more concerned about the welfare of others and issues that may affect them, such as environmental degradation.

In support of this idea, studies have shown that differences in self-construal—or cultural patterns in how people define and experience the self in relation to others—are related to environmental attitudes: Initial findings suggested that those who see themselves as more interdependent with others tend to be more concerned about environmental issues than those who see themselves as more independent from others (Arnocky, Stroink, & DeCicco, 2007). However, cross-cultural research to support this finding is relatively limited (but see Komatsu, Rappleye, & Silova, 2019), and an increased interest in this topic has led to some mixed findings (Davis & Stroink, 2016; Gibson & Reysen, 2014). One possible reason for this is that measures and manipulations of self-construal often confound numerous forms of independence and forms of interdependence into unitary dimensions.

Recently, Vignoles et al. (2016) developed a more nuanced model of self-construal, validated in six world regions, that distinguishes cross-cultural variation in seven dimensions of self–other orientations. To the best of our knowledge, this model has yet to be used to study directly the relation between self-construal and environmentalism. However, it could help to explain inconsistencies in previous research, allowing for a more precise understanding of particular forms of self–other orientations that may be more relevant to self–nature relations. Hence, this study aims to expand upon the idea that interdependent (as opposed to independent) orientations of the self are positively related to environmentalism through a cross-cultural exploration of the relationships between seven dimensions of self-construal and endorsement of environmental values.

### **Self-Construal**

The study of cross-cultural differences in self–other orientations has become central for understanding how culture affects people’s values and social behaviour (Cross & Madson, 1997; Markus & Kitayama, 1991; Matsumoto, 1999; Singelis, 1994). In their seminal article, Markus and Kitayama (1991) proposed a global distinction between independent and interdependent models of the self, which they suggested were promoted in Western and East Asian cultures, respectively. An independent self-construal represents a view of the self as stable across different contexts, informed by personal characteristics, and separate from other people. In contrast, an interdependent self-construal represents a view of the self that is receptive to context, informed by family relationships, and connected to others.

According to Markus and Kitayama (1991), individuals have access to both types of self-construal, but socio-cultural processes promote one particular self-construal over the other, which in turn may explain cultural differences in motivation, cognition, and values (for more recent reviews see Cross, Hardin, & Gerecht-Swing, 2011; Markus & Kitayama, 2010). In support of this, experimental research has shown that priming an independent self-construal can increase personal-focused values (e.g., freedom, independence) that are often associated with North American cultures, while priming an interdependent self-construal can increase social-focused values (e.g., social belongingness, family safety) that are often associated with East Asian cultures (Gardner, Gabriel, & Lee, 1999; Oyserman & Lee, 2008). More notably to the present research, scholars have long suggested that self-concepts are important for understanding and predicting pro-environmental attitudes and behaviours (Kellert & Wilson, 1995; Schultz, 2002).

### **Self-Construal and Environmentalism**

Perhaps the first to empirically link self–other orientations to environmentalism, Arnocky, Stroink, and DeCicco (2007) found that an interdependent self-construal correlated

with resource cooperation in an environmental commons dilemma, whilst an independent self-construal correlated with competition in sharing resources and egoistic environmental concern (i.e., concern about environmental problems because of the consequences for one's self). Subsequently, Davis and Stroink (2016) also found that an interdependent self-construal correlated with altruistic environmental concern (i.e., concern about environmental problems because of the consequences for other people)—which has been linked to greater inclusion of nature in self (Schultz, 2001). Moreover, Kim (2011) found that self-transcendent values mediated the relationship between an interdependent self-construal and green purchasing, whilst experimental studies have found that priming an interdependent self-construal (compared to a control) increased pro-environmental values (Gibson & Reysen, 2014) and green purchasing intentions (see Chuang, Xie, & Liu, 2016; Dogan & Ozmen, 2017).

More recently, Komatsu, Rappleye, and Silova (2019) found that national levels of independence were positively associated with national ecological footprint, such that nations higher in interdependence had a lower ecological footprint (see also Gouveia, 2002). These findings are further supported by research outside of the self-construal literature: Postmes, Rabinovich, Morton, and Van Zomeren (2014) found that an expanded definition of the self was an integral component of sustainable social identities; research indicates that self-transcendent values are often associated with, or even subsume, environmental values (Stern, Dietz, & Kalof, 1993; for meta-analytical reviews, see Boer & Fischer, 2013; Milfont, 2012); whilst experimental research shows that in the absence of environmental values, increasing a person's self-focus decreases their connection to nature (Frantz, Mayer, Norton, & Rock, 2005).

In summary, the extant literature indicates that those who feel more connected to others (higher in interdependence) are more concerned about environmental issues and are more likely to take pro-environmental actions compared to those who feel less connected to

others (higher in independence). Schultz (2002) argued that the inclusion of nature in self is fundamental for building a commitment to protect the biosphere. Extending those ideas, this body of research suggests that including others in the self can also lead to pro-environmental behavior because those who are more connected to others are also more connected to nature. Hence, Arnocky, Stroink, and DeCicco (2007) proposed that a more expanded definition of self (to include others and/or nature) leads to a greater concern for environmental issues.

However, several findings contradict these ideas and show that an independent self-construal can also predict pro-environmental attitudes and behaviours (Davis & Stroink, 2016; Gibson & Reysen, 2014; Mancha & Yoder, 2015; Zhou, Huang, & Wei, 2017). Although these associations are often weaker than those of an interdependent self-construal (Gibson & Reysen, 2014; Zhou, Huang, & Wei, 2017), a focus on the independent self has been shown to predict pro-environmental behaviours when those behaviours have a direct benefit to the self (De Dominicis, Schultz, & Bonaiuto, 2017; Mancha & Yoder, 2015). At the same time, these findings—as well as those linking interdependence to environmentalism—could also be a product of conceptual and measurement issues within the self-construal literature as the dimensionality of self-construal has been a source of debate (Cross, Hardin, & Gercek-Swing, 2011; Milfont, 2005; Taras et al., 2014). Specifically, researchers have disputed whether independence and interdependence represent dichotomous ends of the same construct, separate constructs, or umbrella terms for multiple dimensions (Taras et al., 2014; Vignoles et al., 2016). Therefore, progressing the theory and measurement of self-construal as a multidimensional construct has become an important topic of inquiry (Cross et al., 2011; Vignoles et al., 2016).

### **Seven Dimensions of Self-Construal**

Although Markus and Kitayama's theory of self-construal has had a major influence on psychological research, the two-dimensional structure of self-construal comprising

independence and interdependence has been questioned (see, e.g., Hardin, Leong, & Bhagwat, 2004; Killen & Wainryb, 2000; Milfont, 2005). Scholars have also raised concerns about the overreliance on East Asian (e.g., China, Japan) and Western (e.g., North American, North-West European) samples in the self-construal literature that has led to a tendency to dichotomize cultures along an east-west continuum, failing to represent how self-construal may be conceptualized in other world regions (Matsumoto, 1999; Taras et al., 2014; Vignoles, 2018).

Responding to these challenges, Vignoles et al. (2016) conducted an exploratory analysis of self-construal across 16 cultures, followed by a confirmatory analysis across 55 cultural groups spanning six world regions. They found convergent evidence for seven distinct, bipolar dimensions of self-construal at both individual and cultural levels of analysis, each linked to a specific domain of personal or social functioning. Table 1 presents these seven dimensions, with items scored in each direction to illustrate their independent and interdependent poles. (We expand further on the definition of each in the next section.) The bipolar structure of these dimensions means that being more independent entails being less interdependent *within* each dimension, but their multiplicity means that one can simultaneously express independent and interdependent orientations *across* dimensions. For example, seeing oneself as more self-reliant entails by definition that one should see oneself as less dependent on others, but not necessarily that one should see oneself as more different and less similar to others. Similarly, seeing oneself as more self-contained entails by definition that one should see oneself as less connected to others, but not necessarily that one should see oneself as more consistent and less variable across contexts. Subsequent evidence for the bipolar structure of these dimensions and their discriminability from each other has been found across at least five multinational studies (Krys et al., 2021; Owe, 2012; Smith, Ahmad et al., 2016; Smith et al., 2020; Yang, 2018).

Vignoles and colleagues' (2016) model provides a more nuanced perspective on the role of culture in defining the self, showing patterns of variation across regions of the world that go beyond the simpler independent-interdependent, and West-East dichotomies (see also Krys, Vignoles, de Almeida & Uchida, in press; Vignoles, Smith, Becker, & Easterbrook, 2018). Notably, studies have begun to explore how these multiple dimensions of self-construal are differentially associated with socioecological and contextual predictors (Sánchez Rodríguez et al., 2021; Vignoles et al., 2016; Yang & Vignoles, 2020), as well as with a range of outcomes of interest, including measures of well-being and mental health (Krys et al., 2021; Smith, Ahmad et al., 2016; Smith et al., 2020), communication styles (Smith, Vignoles et al., 2016), and cognitive, affective and motivational tendencies (Yang, 2018). Crucially, then, adopting a multidimensional model of self-construal should enable a more detailed and precise investigation of how variations in self–other orientations are related to environmentalism.

### **Initial Theorising Linking the Seven Dimensions of Self-Construal and Environmentalism**

Based on the extant literature, it is reasonable to expect that those with higher interdependent views of the self are more concerned about environmental issues and more likely to take pro-environmental actions compared to those with higher independent views of the self. However, it is also reasonable to expect that this overall prediction is not uniform across the seven dimensions of self-construal. Our initial theorising about the relations between specific self-construal dimensions and environmental values was necessarily tentative given the novelty of the multidimensional self-construal model. Nonetheless, we developed some expectations based on reasoning about the meanings and possible implications of the seven self-construal dimensions. This led us to predict main effects of three self-construal dimensions in relation to environmental values and interaction effects of

two other self-construal dimensions with cultural norms about environmental protection. We formed no specific predictions about the remaining two self-construal dimensions.

### **Predicted Main Effects**

*Self-containment versus connectedness to others* distinguishes those who tend to experience themselves as firmly bounded and separate from others (self-containment) from those who tend to experience fuzzier self–other boundaries and include significant others within their sense of self (connectedness to others). As such, this dimension is closely related to constructs such as self-expansion (Aron, Aron, & Smollan, 1992) that have been at the heart of previous theorising about similarities between self–other and self–nature relations (Schultz, 2002). Specifically, we reasoned that those with a more self-contained sense of self would be less likely to include nature in their self-conceptions, and thus we predicted that self-containment (vs. connectedness to others) would correlate negatively with endorsement of environmental values.

*Self-reliance versus dependence on others* distinguishes those who tend to view themselves as self-sufficient and able to look after themselves (self-reliance) from those who are more willing to recognise and rely on the support of others (dependence on others). Given that humans are ultra-social animals (Tomasello, 2014), construing oneself as self-reliant is arguably a defensive and oversimplifying self-view that fails to recognise the complexity and causal interconnectedness of human social life. Hence, we speculated that those who view themselves as more self-reliant might similarly fail to recognise the causal complexity of humans' collective dependence on the natural environment. Accordingly, we predicted that self-reliance (vs. dependence on others) would correlate negatively with endorsement of environmental values.

*Self-interest versus commitment to others* distinguishes those who report putting their personal interests before the interests of others (self-interest) from those who report putting

the interests of others before their own (commitment to others). This dimension has a strong resonance with previous arguments for the altruistic basis of environmentalism (Nolan & Schultz, 2015), given that pro-environmental choices are often seen as benefitting geographically or temporally distant others at a cost to one's immediate personal interests. Admittedly, previous research suggests that people may sometimes engage in environmental behaviour for self-interested reasons (e.g., buying an expensive electric vehicle as a status symbol), but the values underpinning such behaviour are likely to be self-enhancing values, rather than environmental values per se (De Dominicis, Schultz, & Bonaiuto, 2017). Thus, we predicted that self-interest (vs. commitment to others) would also correlate negatively with endorsement of environmental values.

### **Predicted Multilevel Interaction Effects**

*Difference versus similarity* distinguishes those who see themselves as—and strive to be—unique and different from others (difference) from those who see themselves as—and strive to be—similar to others (similarity). We reasoned that the implications of this dimension for environmentalism may depend on the normative levels of environmental concern in an individual's cultural context, since those who construed themselves as more different from (vs. similar to) others might be more likely to depart from the normative environmental approach in their cultural setting. Hence, where stronger pro-environmental norms were prevalent, we expected that those seeking to be similar to others would show higher endorsement of environmental values, whereas those seeking to be different from others might pursue this goal by adopting a counter-normative position; where pro-environmental norms were weak or absent, we expected that this association would be weaker, absent or possibly even reversed. Thus, we predicted an interaction effect between difference (vs. similarity) and cultural norms of environmental protection predicting endorsement of environmental values.

*Self-direction versus receptiveness to influence* distinguishes those who view themselves as making their own decisions (self-direction) from those who are more open to being influenced by others' expectations (receptiveness to influence). Again, we reasoned that the implications of this dimension for environmentalism would depend on the normative levels of environmental concern in an individual's cultural context—since those who viewed themselves as receptive to influence might be more likely to treat cultural norms as having a prescriptive weight, whereas those who saw themselves as self-directed might seek to demonstrate their self-directedness by adopting a counter-normative position (see Schlenker & Weigold, 1992). Thus, we predicted an interaction effect such that self-direction (vs. receptiveness to influence) would be negatively associated with endorsement of environmental values in cultural contexts with stronger pro-environmental norms, but this trend might be weaker or even reversed in cultural contexts with weak or absent pro-environmental norms.

### **Dimensions Without Predictions**

*Consistency versus variability* distinguishes those who view themselves as largely stable and unchanging across contexts (consistency) from those who view themselves as changing across contexts (variability). *Self-expression versus harmony* distinguishes those who tend to speak their mind directly even if it would disrupt the harmony of their relationships (self-expression) from those who tend to prioritise relationship harmony even if this means not expressing their true thoughts or feelings (harmony). We made no a priori predictions about how these two self-construal dimensions might relate to environmental values. Nevertheless, we included both dimensions in our analyses to provide a complete picture.

### The Current Research

Whilst previous research shows correlations between self-construal and environmental attitudes (Arnocky, Stroink, & DeCicco, 2007; Davis & Stroink, 2016), the model of selfhood proposed by Vignoles and colleagues (2016) provides an opportunity for greater nuance in understanding which aspects of selfhood are most consequential to environmentalism. The present study contributes to this literature by exploring the relationships between the seven dimensions of self-construal detailed above and endorsement of environmental values within 55 cultures, across 33 nations spanning six world regions.

Given the novelty of the seven-dimensional self-construal model, as well as our awareness of the pitfalls of premature theoretical closure in cross-cultural psychology (see Vignoles, 2018), we conducted our study in a spirit of theoretically-guided exploration. Based on previous research and theorizing, we made some initial predictions described above. However, we explored the pattern of associations between self-construal dimensions and environmental values in a comprehensive manner. Thus, we were open to learning new insights from the data that might not have been easily predicted from the researchers' prior theoretical or cultural perspectives. This study aims to lay the foundations for future research by establishing how a more nuanced model and measure of selfhood can highlight previously undifferentiated aspects of the self that are related to environmental attitudes.

Our initial predictions were as follows. First, since the interdependent pole of the self-construal dimensions more clearly assesses an expanded view of the self, we expected that the interdependent dimensional poles would have positive correlations with environmental values; or conversely, environmental values would correlate negatively with the independent pole of the self-construal dimensions (H1). Second, and going beyond this broad prediction, we expected that endorsement of environmental values would correlate negatively with three specific dimensions of self-construal: *self-containment* (vs. *connectedness to others*), *self-*

*reliance (vs. dependence on others)* and *self-interest (vs. commitment to others)* (H2-H4, respectively). For completeness, we also explored unpredicted direct relationships between other self-construal dimensions and environmental values. Since age and gender have been shown to influence environmental concern (Gifford & Nilsson, 2014), these variables are used as control variables to isolate the effects of selfhood on environmental values in the individual-level analysis.

Second, we expanded these individual-level predictions by examining the extent to which nation-level variables influence the associations between self-construal dimensions and environmental values. We thus employ multilevel techniques to examine the variability in these relationships and test whether observed variability is explained by societal variables. Our main moderation predictions focused on the normative level of environmental protection in each cultural context. We expected that the associations of environmental values with two further dimensions of self-construal—*difference (vs. similarity)* and *self-direction (vs. receptiveness to influence)*—would differ across cultures, as a function of the normative level of environmental protection. Specifically, those who construed themselves as more self-directed and/or different from others might be more likely to depart from the normative environmental approach in their cultural setting. Thus, we expected that these two self-construal dimensions would correlate more negatively with environmental values in countries with higher levels of environmental performance (H5 and H6, respectively), and used the Environmental Performance Index (EPI) as a measure of how well nations perform on environmental protection.

Finally, although the focus of our moderation predictions is on the normative level of environmental protection in each cultural context, prior research has shown that other nation-level variables also impact environmentally relevant relationships (Bain et al., 2016; Milfont et al., 2018; Liu & Sibley, 2012; Milfont & Markowitz, 2016). Thus, we explore whether the

associations between self-construal dimensions and environmental values are influenced by the cultural-level scores of the self-construal dimensions, as well as by the standard of living and inequality of each country as assessed by the Human Development Index (HDI) and the Gini index, respectively. We particularly focus on EPI, HDI and Gini because prior work has shown they moderate individual-level associations in the environmental domain (Milfont et al., 2018). We pre-registered our tentative predictions in the Open Science Framework (<https://osf.io/ephvg/>) prior to any data analyses.

### **Method**

Our study is a secondary analysis of data from Vignoles et al. (2016, Study 2) collected between 2009 and 2010. The variables analysed here were part of a larger multinational study on culture and identity processes (Vignoles & Brown, 2011; see also Becker et al., 2018; Owe et al., 2013; Smith et al., 2016; Vignoles, Smith, Becker, & Easterbrook, 2018). Our analyses focus on relationships between self-construal dimensions and endorsement of environmental values, which have not previously been reported.

### **Participants**

Participants were 7,279 adults from 55 cultural groups in 33 nations spanning Western and Eastern Europe, Sub-Saharan Africa, Southeast Asia, the Middle East, and South America (see Table 2). Where possible, several cultural groups were targeted within each nation, based on geographic (e.g., China: East and West), ethnic (e.g., Chile: majority and Mapuche), religious (e.g., Philippines: Christians and Muslims), or economic (e.g., Belgium: high and low SES) differences. Largely non-student adult samples were collected using snowballing from researchers' social networks, community groups and non-governmental organizations, as well as relatives of university students.

### **Measures**

#### **Variables Assessing Main Effects**

**Predictor Variables: Self-Construal Scale.** This scale measures the preferences of individuals to act or express themselves as either independent or interdependent across seven domains. We used data for the 22 self-construal items that best represented the seven dimensions of self-construal across cultures in Study 2 of Vignoles et al. (2016). Table 1 presents examples of items for each dimension, and the 22-item scale is presented in the Supplementary Material.

Participants were asked: “How well does each of these statements describe you.” Items were worded with “you” to make the items seem more natural for members of cultures that were less used to completing introspective survey questions, and where research assistants needed to help semi-literate participants read the items. To reduce the influence of within-culture comparison processes on responses (see Heine, Lehman, Peng, & Greenholtz, 2002), the rubric prompted participants to compare each item with the other items rather than comparing themselves to other individuals within their cultural setting. Participants rated each item on a 9-point response scale ranging from 1 (*not at all like me*) to 9 (*exactly like me*), with the intermediates 3 (*a little*), 5 (*moderately*), and 7 (*very well*).

For this study, we used factor scores saved from the multilevel measurement model reported by Vignoles and colleagues (2016, Study 2). The measurement model included a method factor designed to capture individual and cultural variation in acquiescent response styles so that the substantive factor scores would not be confounded by differences in response style. Positive scores indicate a relatively higher preference for an ‘independent’ view of the self and negative scores indicate a relatively higher preference for an ‘interdependent’ view of the self, within each dimension.

**Outcome Variable: Endorsement of Environmental Values.** Environmental values were measured with a single item taken from the Portrait Values Questionnaire (PVQ) originally developed for the European Social Survey (Schwartz, 2007). The item reads:

“[She/He] strongly believes that people should care for nature. Looking after the environment is important to [her/him].” Participants were asked to rate this item on a 6-point response scale from 1 (*very much like me*) to 6 (*not at all like me*) based on how much the person in the description was like themselves. Gender of the statement was matched to the participant.

As recommended by the scale author (Schwartz, 2007), the environmental values scores were ipsatized by subtracting each participant’s average response across all 21 PVQ items to reduce the effect of acquiescent response styles. In this way, scores represent the relative priority given to environmental values compared to a comprehensive range of other competing value priorities, consistent with findings that behaviours are best predicted by “trade-offs” among competing value priorities, rather than by single values alone (e.g., Schwartz et al., 2017). Adjusting for response style is usual in studies using Schwartz’ values scales, but this was especially important for our current study since response styles on the PVQ are known to be significantly associated with many of the self-construal dimensions used here (Smith et al., 2016), and so our results would otherwise be confounded by these associations. Scores were reversed so that higher scores indicate greater endorsement of environmental values relative to other human values.

### **Variables Assessing Moderation Effects**

***Cultural Models of Selfhood.*** We used the saved cultural-level scores for each dimension of self-construal from the measurement model reported by Vignoles and colleagues (2016, Study 2) as cultural (Level 2) variables in multilevel models to test whether cultural models of selfhood would moderate the individual-level relationship between each of the seven dimensions of self-construal and endorsement of environmental values. Cultural scores were created through variance decomposition for each item across both levels of analysis (individual and cultural), and random intercepts were then used as the indicators for

each self-construal dimension at the cultural level (for further details, see Vignoles et al., 2016).

*Environmental Performance, Affluence and Inequality.* The EPI ranks nations on two domains of environmental performance: protection of ecosystems and protection of human health. The indicators for these domains measure a nation's performance relative to internationally established standards or comparative performance to other nations. The EPI has a theoretical range from 0 to 100, with a higher score indicating better environmental performance. We retrieved the 2010 EPI scores for the 33 nations from which participants were recruited, which ranged from 43.1 (Ethiopia) to 93.5 (Iceland).

We also included the HDI and Gini in our analysis. The HDI is a measure of a nation's average achievement in respect to three dimensions of human development: Life expectancy at birth, education (expected and mean years of schooling), and standard of living (gross national income per capita). The 2010 HDI scores for Lebanon and Oman are missing, so we retrieved the 2011 HDI which had values for all 33 nations included in the current study. HDI has a theoretical range from 0 to 1 and values ranged from .36 (Ethiopia) to .94 (Norway), with a greater score indicating higher human development. The Gini index is a measure of a nation's level of income inequality based on household disposable income in a given year, and has a theoretical range from 0 (perfect equality) to 100 (perfect inequality). We retrieved the 2010 Gini which had available values to 21 nations included in the current study and values ranged from 25.7 (Ethiopia) to 54.6 (Colombia). Spearman's rank-order correlations indicated the 2010 Gini index was reliably negatively associated with the 2011 HDI ( $r = -.49, p = .023$ ) but not reliably negatively associated with the 2010 EPI ( $r = -.36, p = .110$ ); and the 2010 EPI and 2011 HDI were positively associated ( $r = .73, p < .001$ ).

## Results

### Meta-Analytic Results

We first calculated the correlations between each dimension of self-construal and environmental values within each culture in R Studio (R Core Team, 2013) using the package “tidyverse” (Wickham, 2017). These correlations were then used to produce meta-analytic effect sizes for the correlation between each self-construal dimension and environmental values across cultures, using Jamovi software (The Jamovi Project, 2019) with restricted maximum likelihood estimation for random-effects and Fisher’s r-to-z correlation transformation. The correlations for each culture and the meta-analytic results are presented in Table S1 and the R script for all analyses is available from the Open Science Framework (<https://osf.io/7fxp2/>).

As can be seen in the forest plot in Figure 1, the meta-analytical results indicate negative correlations for five of the seven self-construal dimensions, mostly supporting our H1 that interdependent views of the self would be associated with greater environmental values across cultures. However, the associations varied markedly across dimensions. The meta-analytic results showed that six dimensions correlated statistically significantly with environmental values—five negatively and one positively.

We predicted that *self-containment (vs. connectedness to others)*, *self-interest (vs. commitment to others)*, and *self-reliance (vs. dependence on others)* would correlate negatively with environmental values across cultures. Supporting our H2 and H4, *self-containment (vs. connectedness to others)* ( $r_z' = -.16$ , 95% CI [-.18, -.13],  $p < .001$ ) and *self-interest (vs. commitment to others)* ( $r_z' = -.17$ , 95% CI [-.20, -.14],  $p < .001$ ) correlated negatively with endorsement for environmental values across cultures. However, rejecting our H3 *self-reliance (vs. dependence on others)* showed no reliable association ( $r_z' = .02$ , 95% CI [-.01, .05],  $p = .168$ ). Beyond our predictions, we found that *self-direction (vs.*

*receptiveness to influence*) ( $r_z' = -.10$ , 95% CI [-.12, -.07],  $p < .001$ ), *difference (vs. similarity)* ( $r_z' = -.06$ , 95% CI [-.08, -.03],  $p < .001$ ), and *self-expression (vs. harmony)* ( $r_z' = -.08$ , 95% CI [-.11, -.06],  $p < .001$ ) correlated negatively; whilst *consistency (vs. variability)* ( $r_z' = .10$ , 95% CI [.08, .13],  $p < .001$ ) correlated positively with environmental values.

### Testing Robustness of Correlations

To investigate the robustness of the correlations, we first estimated independent multilevel models for each dimension of self-construal predicting environmental values (seven separate models) using random intercepts and slopes for each culture (or nation). We then ran an eighth model with all seven dimensions of self-construal predicting environmental values with fixed intercepts and slopes to see whether the associations persisted when controlling for the other dimensions. These analyses were run in R Studio (R Core Team, 2013) using the package “lmerTest” (Kuznetsova, Brockhoff, & Christensen, 2017) with restricted maximum likelihood estimation.

The robustness models largely reproduced the results of the meta-analytic findings. In models involving each separate self-construal dimension, *self-interest (vs. commitment to others)*, *self-containment (vs. connectedness to others)*, *self-direction (vs. receptiveness to influence)*, *self-expression (vs. harmony)* and *difference (vs. similarity)* all negatively correlated with environmental values, whilst *consistency (vs. variability)* had a positive correlation (see Table S2). Further supporting H2 and H4, the observed associations of environmental values with *self-containment (vs. connectedness to others)* and *self-interest (vs. commitment to others)* persisted when controlling for the other self-construal dimensions (see Table 3). In this more stringent test, the observed associations with *difference (vs. similarity)* and *consistency (vs. variability)* also remained significant; however, the association with *self-expression (vs. harmony)* was reduced to non-significance and the

association with *self-direction* (*vs. receptiveness to influence*) was unexpectedly reversed (Table 3).

The final robustness test involved adding age and gender as additional individual-level predictors of environment values in the models examining each dimension separately. When age and gender were added to the models, the predicted associations of environmental values with *self-containment* (*vs. connectedness to others*) and *self-interest* (*vs. commitment to others*) persisted, as well as those with *self-direction* (*vs. receptiveness to influence*), *consistency* (*vs. variability*), and *self-expression* (*vs. harmony*) (see Supplementary Material and Table S2).

### **Moderation by Cultural Models of Selfhood**

Confirming our expectation that the relation between self-construal and environmental values would vary across cultures, the significance of Q-statistics for the meta-analytic summary in Figure 1 indicated heterogeneity for the association between five dimensions of self-construal and environmental values. We first investigated whether cultural models of selfhood moderated the individual-level relationship between each dimension of self-construal and environmental values with multilevel models. We added cultural-level scores for each dimension of self-construal and the interaction term between each cultural-level score and the individual-level self-construal dimension for each multilevel model. Three cultural-level dimensions of self-construal showed a moderating effect on the negative relationship between *self-interest* (*vs. commitment to others*) and environmental values: *difference* (*vs. similarity*) ( $\gamma = -.062$ ,  $SE = .030$ ,  $t(54) = -2.07$ ,  $p = .044$ ), *self-interest* (*vs. commitment to others*) ( $\gamma = .070$ ,  $SE = .035$ ,  $t(54) = 2.03$ ,  $p = .048$ ), and *self-expression* (*vs. harmony*) ( $\gamma = -.085$ ,  $SE = .042$ ,  $t(54) = -2.05$ ,  $p = .047$ ).

However, these moderations were not statistically significant when other nation-level variables were added to the models, suggesting that the observed effects may be attributed to

variation in these national-level variables, rather than cultural models of selfhood per se (see Vignoles et al., 2016, for the relation between HDI and cultural models of selfhood).

Therefore, we consider there to be no reliable moderation effects of cultural models of selfhood.

### **Moderation by Environmental Performance, Affluence and Inequality**

Finally, we tested whether national levels of environmental performance, affluence and inequality could explain observed variance in the individual-level relationship between each dimension of self-construal and environmental values across nations. These analyses allowed us to test H5 and H6: predicting respectively that difference (vs. similarity) and self-direction (vs. reception to influence) would be associated more negatively with endorsement of environmental values as a function of the normative level of environmental protection in each cultural context. Given the exploratory nature of our study, we considered the nation-level variables one at a time in the multilevel models (e.g., only EPI or Gini) as well as in combination (e.g., EPI and HDI together, EPI, HDI and Gini together). These were added as nation-level predictors together with the interaction term between each nation-level predictor and the individual-level self-construal dimension in each model (with random intercepts for each nation). Tables S3 and S4 provide the full results.

Against our predictions, we found no significant cross-level interaction effects between EPI and either difference (vs. similarity) or self-direction (vs. receptiveness to influence). However, we found evidence that EPI moderated the association between self-interest (vs. commitment to others) and environmental values. Simple slopes indicated that the individual-level negative association between self-interest (vs. commitment to others) and environmental values is stronger at higher levels of EPI ( $\gamma = -.226, t(7065) = -12.16, p < .001$ ) than at lower levels ( $\gamma = -.144, t(7065) = -8.16, p < .001$ ). According to this interaction, the strongest endorsement for environmental values occurred for those who were

more committed to others and lived within nations with greater environmental performance (see Figure 2). Perhaps unsurprisingly considering the high correlation between EPI and HDI (.73), a similar significant cross-level interaction was observed for HDI (i.e., high HDI,  $\gamma = -.230$ ,  $t(7065) = -12.50$ ,  $p < .001$ ; low HDI,  $\gamma = -.142$ ,  $t(7065) = -8.00$ ,  $p < .001$ ), but the individual effects of both EPI and HDI vanish when modelled together or when Gini was added to the models.

EPI also moderated the association between consistency (vs. variability) and environmental values but only when modelled together with HDI or Gini. This suggests the moderation effect may be unreliable. No other cross-level interaction effects were observed for EPI, HDI or Gini (see Tables S3 and S4).

### Discussion

Individual differences in self–other orientations had been shown to relate to pro-environmental attitudes in previous research (Arnocky, Stroink, & DeCicco, 2007; Chuang, Xie, & Liu, 2016; Davis & Stroink, 2016; Dogan & Ozmen, 2017). Yet, a lack of cross-cultural research and some inconsistent findings (Davis & Stroink, 2016; Gibson & Reysen, 2014) warranted further investigation into this relationship. Using Vignoles and colleagues' (2016) cultural models of selfhood, we tested how seven ways of being independent or interdependent correlated with endorsing environmental values among 7,279 members of 55 cultural groups.

As predicted, we found that an interdependent (rather than independent) view of the self was related to environmental values on five of the seven self-construal dimensions studied (H1). Notably, not all interdependent poles had the same relations to environmental values. Participants reporting greater connectedness to others (vs. self-containment) and greater commitment to others (vs. self-interest) consistently showed greater endorsement of environmental values (H2, H4). These findings remained statistically significant when all

seven self-construal dimensions were modelled together, as well as when controlling for age and gender. Against our prediction, participants reporting more dependence on others (vs. self-reliance) did not show greater environmental values (H3). Unexpectedly, we also found greater endorsement of environmental values among participants reporting greater consistency (vs. variability) across contexts—linking environmental values to the independent pole, rather than the interdependent pole, of this self-construal dimension. As we discuss below, these results may help to explain the seemingly inconsistent pattern of previous findings that have linked environmental concern to interdependent self-construal but sometimes also to independent self-construal.

Going beyond individual-level analysis, tests of cross-level interaction effects did not support our (somewhat tentative) predictions. The expected association of environmental values with similarity (vs. difference) appeared inconsistently as a main effect across analyses, and it was not significantly moderated by EPI as we had predicted (against H5); the association with self-direction (vs. reception to influence) appeared in inconsistent directions across analyses, and again was not significantly moderated by EPI (against H6). Nonetheless, we found some evidence that associations of self-construal with environmental values may be moderated by cultural context. Most notably, the previously noted association with commitment to others (tested in H3) was stronger in nations with the highest levels of environmental protection and national development. We discuss these main findings below.

### **Links between Self–Other and Self–Nature Relations across Cultures**

Our results confirmed the relationship between self-construal and environmental values, reinforcing the importance that socio-cultural processes have on people's orientations towards the environment. Notably, most of the relationships between self-construal and environmental values represented interdependent self–other orientations, consistent with previous research showing that those who are more interdependent are more pro-

environmental than those who are more independent (Arnocky, Stroink, & DeCicco, 2007; Chuang, Xie, & Liu, 2016; Dogan & Ozmen, 2017; Gibson & Reysen, 2014). Going beyond a two-dimensional model of self-construal, environmental values seem to be most influenced by how the self is experienced (self-containment vs. connectedness to others) and how individuals deal with conflicting interests (self-interest vs. commitment to others) relative to other domains of self–other orientations—supporting H2 and H4. Individuals who are more connected and committed to others are the most likely to believe people should care for nature. Hence, these appear to be the two main ways that interdependent self-construal relates to environmental values across cultures.

Our findings are consistent with the idea that the extent to which we see other people as part of the self influences our attitudes towards nature. Since the self-construal dimension of connectedness to others (vs. self-containment) is conceptually similar to theories and measures of “inclusion of others in the self” (Aron, Aron, & Smollan, 1992), this finding supports previous theoretical arguments that a greater inclusion of others in self translates into a greater inclusion of nature in self (Arnocky, Stroink, & DeCicco, 2007; Milfont & Schultz, 2018; Nolan & Schultz, 2015; Postmes et al., 2014; Schultz, 2002), and we provide novel evidence that this is reliable across cultures. However, our findings suggest that this is not the only way that self-construal influences our environmental values. Supporting the social psychological literature on values (Stern, Dietz, & Kalof, 1993; for meta-analytical reviews, see Boer & Fischer, 2013; Milfont, 2012), environmental values appear to be greater in those who see themselves as more likely to prioritise others’ interests above their self-interest, indicating that seeing the self as separate to others does not preclude someone being pro-environmental when they feel a strong commitment to others.

Unpredicted consistent associations were also found for an independent form of self-construal. Interestingly, environmentalism seem to be influenced by how the self moves

between contexts (consistency vs. variability)—those who see themselves as more consistent across contexts seem to endorse greater environmental values than those who are more variable across contexts. Perhaps greater endorsement for environmental values is linked to consistency across contexts because environmental degradation is a global issue that requires a person to act and think consistently across different contexts. That one aspect of an independent view of the self was related to environmentalism is consistent with previous research showing that independent self-construal can also predict pro-environmental attitudes and behaviours (Davis & Stroink, 2016; Gibson & Reysen, 2014; Mancha & Yoder, 2005; Zhou, Huang, & Wei, 2017). Finally, self-reliance (vs. dependence others) was consistently unrelated to environmental values, but this self-construal dimension is linked to extreme responding in cross-cultural surveys (Smith, Vignoles et al., 2016); so, this non-finding provides further evidence of discriminant validity for the self-construal dimensions proposed by see Vignoles et al. (2016).

Besides the consistent negative associations for self-containment (vs. connectedness to others) and self-interest (vs. commitment to others), the positive association for consistency (vs. variability) and non-association for self-reliance (vs. dependence others), other less consistent associations were observed which could be explored in future research. Specifically, those who are more receptive to influence when making decisions were more likely to endorse environmental values, perhaps because they are more willing to accept the scientific consensus on global environmental issues and understand the importance of looking after the natural environment; although this finding was reversed when controlling for the other self-construal dimensions. Moreover, greater harmony when communicating with others involves restraining self-expression and thus may represent greater self-control. A sense of control is an important personal factor influencing pro-environmental concern and behaviour (Gifford & Nilsson, 2014), and has previously been shown to be a mediating

variable in the relationship between self-construal and environmentalism (Chuang et al., 2016); but this finding become non-significant when controlling for the other self-construal dimensions.

In summary, these findings go beyond our pre-registered predictions and show the value in adopting a multidimensional model of self-construal in environmental research, which unearths the diverse ways in which environmentalism is linked to patterns of self-construal and provides new avenues to further refine theoretical conceptions of this relationship. Earlier, two-dimensional measures of self-construal (Singelis, 1994) could not reveal this complexity, because they confounded numerous ways of being independent and numerous ways of being interdependent into unitary dimensions (see Vignoles et al., 2016).

#### **Moderators of the Relations between Self-Construal Dimensions and Environmentalism**

We also predicted that the relationship between dimensions of self-construal and environmental protection would vary across cultures and that some of this variance might be explained by social context—especially by national differences in environmental performance. Despite reliable cross-cultural evidence that a more expanded view of the self (i.e., connection/commitment to and harmony with others) predicts environmental values, our findings indicated that the negative relationship of self-interest (vs. commitment to others) with environmental values was stronger in societies with better environmental performance, providing further evidence of the relationship between socio-cultural contexts and environmental attitudes (see, e.g., Eom et al., 2016; Milfont et al., 2018; Milfont & Schultz, 2016). Hence, the extent to which those who are more committed to others endorse greater pro-environmental attitudes depends on social context.

One explanation is that self-interest is more aligned with environmental protection in nations where there is already significant environmental damage, whereas in nations with better environmental performance, environmental protection is more aligned to a concern and

commitment to other people because the consequences of environmental degradation are more abstract. Another possibility is that people who prioritize commitment to others above their own self-interest will look to cultural norms in order to understand what sort of actions would be beneficial to others; in nations with better environmental performance, there may also be a stronger cultural narrative promoting environmental concern as a way of showing concern for others.

Furthermore, national environmental performance (indexed with the 2010 EPI) was strongly correlated with national human development (indexed with the 2011 HDI), which also moderated the association between self-interest (vs. commitment to others) with environmental values. This suggests that these effects may represent a more general societal development moderation and support the idea that environmentalism—as well as stronger relations between pro-environmental attitudes and behaviours—are more prominent in wealthier and more developed societies (Bain et al., 2016; Diekmann & Franzen, 1999; Inglehart, 1995); once again highlighting the interdependence between solving global economic disparities and environmental issues.

A third form of interdependence—similarity to others—was associated with environmental values across our main analyses, but became statistically non-significant when controlling for age and gender. Although we had originally predicted that this dimension would be influenced by national differences in environmental performance (H5), it may be that pro-environmental norms were sufficiently strong across the 55 cultural contexts sampled to support a significant main effect for this dimension, such that valuing the environment would be a way to be similar to others whereas rejecting environmental values would be a way to be different from others. Consistent with this possibility, Schwartz and Bardi (2001) found that universalism values (which include valuing the environment) are typically among the most highly rated values even across highly diverse cultural samples (see also Milfont & Schultz,

2016). However, an alternative interpretation is that those who define themselves as more similar than different to others may be more inclined to endorse environmental values because they also see themselves as similar to other animals and/or nature which increases their motivation to protect them. Additionally, the association between consistency (vs. variability) with environmental values was moderated by national differences in environmental performance, but only when it was considered in relation to national differences in affluence and inequality, which might indicate a suppression effect and that this moderation is unreliable. These findings deserve further examination.

### **Limitations and Future Directions**

Extending previous research documenting relations between interdependent views of the self and environmentalism, our results go beyond an independent versus interdependent dichotomous view of the self, showing how different dimensions of self-reported ways of being independent or interdependent relate to environmental values. However, it is worth noting that the meta-analytic effect sizes for all self-construal associations were small (in the range of .06 to .17), and our findings are restricted to a single environmental values item, which presents a significant limitation to the findings. Therefore, further investigation of these relations is warranted, ideally combining the self-construal model proposed by Vignoles et al. (2016) with multi-item measures of environmentalism, as well as measures of behavioural intention and actual pro-environmental behaviours.

Our conclusions are also based on cross-sectional correlational data; therefore, there is a need for more experimental and longitudinal research in this domain to test the causal and temporal relations between patterns of self-construal and environmentalism. Several previous studies have shown that priming an interdependent self-construal (compared to a control) can increase pro-environmental values (Gibson et al., 2014) and green purchasing intentions (Chuang et al., 2016; Dogan & Ozmen, 2017), but it remains unclear which forms of self-

construal are activated by commonly used self-construal primes (Yang & Vignoles, 2020) and so further research would be needed to clarify this.

Additionally, previous research has examined possible mechanisms that may explain how aspects of self-construal affect pro-environmental attitudes (Kim, 2011). Given our finding that different dimensions of self-construal were differently associated with environmental values, it seems plausible that a range of different mechanisms could be at play depending on the particular self-construal dimension. Self-concept dimensions that incorporate human–nature relations (i.e., nature connectedness, the metapersonal self-construal), which are related to environmental attitudes (Arnocky, Stroink, & DeCicco, 2007; Komatsu, Rappleye, & Silova, 2019), provide an important avenue for future research examining mechanisms of self–nature relations.

### **Concluding Remarks**

Our cross-cultural findings suggest that those who experience themselves as more connected to others are more willing to endorse environmental protection, providing support for the theoretical argument that a more expanded view of the self leads to stronger environmentalism. Our findings also provide further cross-cultural support for the negative effect of self-interest on environmental values, showing that a greater commitment to others leads to greater endorsement for environmental protection. However, commitment to others is more strongly correlated with environmental values in nations with better national environmental performance and human development. Novel insights about how other dimensions of self-construal relate to environmental values provide a direction for future research and will need to be explored further. Understanding the interaction between socio-cultural processes and environmentalism is essential for building more sustainable societies, and our findings support previous claims that governments, NGOs, and policymakers should

be looking at ways to improve social connectedness, whilst also ensuring the protection of ecosystems.

### References

- Aron, A., Aron, E. N. & Smollan, D. (1992). Inclusion of other in the self scale and the structure of interpersonal closeness. *Journal of Personality and Social Psychology*, 63, 596-612. <https://psycnet.apa.org/doi/10.1037/0022-3514.63.4.596>
- Arnocky, S., Stroink, M., & DeCicco, T. (2007). Self-construal predicts environmental concern, cooperation, and conservation. *Journal of Environmental Psychology*, 27, 255-264. <https://doi.org/10.1016/j.jenvp.2007.06.005>
- Bain, P. G., Milfont, T. L., Kashima, Y., Bilewicz, M., Doron, G., Garðarsdóttir, R. B., ... & Corral-Verdugo, V. (2016). Co-benefits of addressing climate change can motivate action around the world. *Nature Climate Change*, 6, 154-157. <http://dx.doi.org/10.1038/nclimate2814>
- Becker, M., Vignoles, V. L., Owe, E., Easterbrook, M. J., Brown, R., Smith, P. B., ... & Camino, L. (2018). Being oneself through time: Bases of self-continuity across 55 cultures. *Self and Identity*, 17, 276-293. <https://doi.org/10.1080/15298868.2017.1330222>
- Bengston, D. N., DeVaney, L. A., Dockry, M. J., Hines, A., Kubik, G. H., Roe, B., & Romero, M. (2019). Using the implications wheel in horizon scanning: Exploring implications of growing apathy toward the environment. In A. Hines, D. N. Bengston, & M. J. Dockry (Eds.). *The forest futures horizon scanning project* (pp. 34-41). Gen. Tech. Rep. NRS-P-187. Newtown Square, PA: US Department of Agriculture, Forest Service, Northern Research Station. <https://doi.org/10.2737/NRS-GTR-P-187-paper5>
- Boer, D., & Fischer, R. (2013). How and when do personal values guide our attitudes and sociality? Explaining cross-cultural variability in attitude–value linkages. *Psychological Bulletin*, 139, 1113-1147. <https://doi.org/10.1037/a0031347>
- Chuang, Y., Xie, X., & Liu, C. (2016). Interdependent orientations increase pro-environmental preferences when facing self-interest conflicts: The mediating role of self-control. *Journal of Environmental Psychology*, 46, 96-105. <https://doi.org/10.1016/j.jenvp.2016.04.001>
- Cross, S. E., Hardin, E. E., & Gercek-Swing, B. (2011). The what, how, why, and where of self-construal. *Personality and Social Psychology Review*, 15, 142-179. <https://doi.org/10.1177/1088868310373752>

- Cross, S. E., & Madson, L. (1997). Models of the self: Self-construals and gender. *Psychological Bulletin*, *122*, 5-37. <http://dx.doi.org/10.1037/0033-2909.122.1.5>
- Davis, A. C., & Stroink, M. L. (2016). Within-culture differences in self-construal, environmental concern, and proenvironmental behavior. *Ecopsychology*, *8*, 64-73. <https://doi.org/10.1089/eco.2015.0061>
- De Dominicis, S., Schultz, P., & Bonaiuto, M. (2017). Protecting the environment for self-interested reasons: Altruism is not the only pathway to sustainability. *Frontiers in Psychology*, *8*, 1065. <https://doi.org/10.3389/fpsyg.2017.01065>
- DeCicco, T. L., & Stroink, M. L. (2007). A third model of self-construal: The metapersonal self. *International Journal of Transpersonal Studies*, *26*, 82-104. <http://dx.doi.org/10.24972/ijts.2007.26.1.82>
- Dekker, P., Ester, P., & Nas, M. (1997). Religion, culture and environmental concern: An empirical cross-national analysis. *Social Compass*, *44*, 443-458. <https://doi.org/10.1177/003776897044003010>
- Diekmann, A., & Franzen, A. (1999). The wealth of nations and environmental concern. *Environment and Behavior*, *31*, 540-549. <https://doi.org/10.1177/00139169921972227>
- Dogan, V., & Ozmen, M. (2017). Belief in environmentalism and independent/interdependent self-construal as factors predicting interest in and intention to purchase hybrid electric vehicles. *Current Psychology*, *38*, 1-12. <https://doi.org/10.1007/s12144-017-9705-6>
- Eom, K., Kim, H. S., Sherman, D. K., & Ishii, K. (2016). Cultural variability in the link between environmental concern and support for environmental action. *Psychological Science*, *27*, 1331-1339. <https://doi.org/10.1177/0956797616660078>
- Frantz, C., Mayer, F. S., Norton, C., & Rock, M. (2005). There is no “I” in nature: The influence of self-awareness on connectedness to nature. *Journal of Environmental Psychology*, *25*, 427-436. <https://doi.org/10.1016/j.jenvp.2005.10.002>
- Gardner, W. L., Gabriel, S., & Lee, A. Y. (1999). “I” value freedom, but “we” value relationships: Self-construal priming mirrors cultural differences in judgment. *Psychological Science*, *10*, 321-326. <https://doi.org/10.1111/1467-9280.00162>
- Gibson, S., Reysen, S., & Katzarska-Miller, I. (2014). Independent and interdependent self-construal and global citizenship. *International Journal of Business & Public Administration*, *11*, 62-72
- Gifford, R. (2014). Environmental psychology matters. *Annual Review of Psychology*, *65*, 541-579. <https://doi.org/10.1146/annurev-psych-010213-115048>

- Gifford, R., & Nilsson, A. (2014). Personal and social factors that influence pro-environmental concern and behaviour: A review. *International Journal of Psychology*, *49*, 141-157. <https://doi.org/10.1002/ijop.12034>
- Gouveia, V. V. (2002). Self, culture and sustainable development. In P. Schmuck & W. P. Schultz (Org.), *Psychology of sustainable development* (pp. 151-174). Norwell, Massachusetts: Kluwer Academic Publishers.
- Hardin, E. E., Leong, F. T., & Bhagwat, A. A. (2004). Factor structure of the self-construal scale revisited: Implications for the multidimensionality of self-construal. *Journal of Cross-Cultural Psychology*, *35*, 327-345. <https://doi.org/10.1177/0022022104264125>
- Heine, S. J., Lehman, D. R., Peng, K., & Greenholtz, J. (2002). What's wrong with cross-cultural comparisons of subjective Likert scales?: The reference-group effect. *Journal of Personality and Social Psychology*, *82*, 903-918. <https://doi.org/10.1037/0022-3514.82.6.903>
- Hsu, A., D. Esty, M. Levy, A. de Sherbinin, et al. 2016. *The 2016 environmental performance index report*. New Haven, CT: Yale Center for Environmental Law and Policy. <http://dx.doi.org/10.13140/RG.2.2.19868.90249>
- Inglehart, R. (1995). Public support for environmental protection: Objective problems and subjective values in 43 societies. *PS: Political Science & Politics*, *28*, 57-72. <https://doi.org/10.2307/420583>
- Inglehart, R. (2018). *Culture shift in advanced industrial society*. Princeton, NJ: Princeton University Press.
- Kashima, Y., Yamaguchi, S., Kim, U., Choi, S. C., Gelfand, M. J., & Yuki, M. (1995). Culture, gender, and self: A perspective from individualism-collectivism research. *Journal of Personality and Social Psychology*, *69*, 925-937. <http://dx.doi.org/10.1037/0022-3514.69.5.925>
- Kellert, S. R., & Wilson, E. O. (Eds.). (1995). *The biophilia hypothesis*. Washington D.C.: Island Press.
- Killen, M., & Wainryb, C. (2000). Independence and interdependence in diverse cultural contexts. *New Directions for Child and Adolescent Development*, *2000*, 5-21. <https://doi.org/10.1002/cd.23220008703>
- Kim, Y. (2011). Understanding green purchase: The influence of collectivism, personal values and environmental attitudes, and the moderating effect of perceived consumer effectiveness. *Seoul Journal of Business*, *17*, 65-92. <http://doi.org/10.35152/snusjb.2011.17.1.003>

- Kollmuss, A., & Agyeman, J. (2002). Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior?. *Environmental Education Research*, 8, 239-260. <https://doi.org/10.1080/13504620220145401>
- Komatsu, H., Rappleye, J., & Silova, I. (2019). Culture and the independent self: Obstacles to environmental sustainability?. *Anthropocene*, 26, 100198. <https://doi.org/10.1016/j.ancene.2019.100198>
- Krys, K., Park, J., Kocimska-Zych, A., Kosiarczyk, A., Selim, H. A., Wojtczuk-Turek, A., ... & Adamovic, M. (2021). Personal life satisfaction as a measure of societal happiness is an individualistic presumption: evidence from fifty countries. *Journal of Happiness Studies*, 22(5), 2197-2214. <https://doi.org/10.1007/s10902-020-00311-y>
- Krys, K., Vignoles, V. L., de Almeida, I. & Uchida, Y. (in press). Outside the ‘cultural binary’: Understanding why Latin American collectivist societies foster independent selves. *Perspectives on Psychological Science*.
- Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). lmerTest package: Tests in linear mixed effects models. *Journal of Statistical Software*, 82, 1-26. <http://doi.org/10.18637/jss.v082.i13>
- Leiserowitz, A. A., Maibach, E., Roser-Renouf, C., Feinberg, G., & Rosenthal, S. (2018). *Climate change in the American mind*. Seattle WA: University of Washington.
- Liu, J. H., & Sibley, C. G. (2012). Hope for the future? Understanding self-sacrifice in the face of global warming among young citizens of the world. *Analyses of Social Issues and Public Policy*, 12, 190-203. <https://doi.org/10.1111/j.1530-2415.2011.01275.x>
- Mackay, C. M., & Schmitt, M. T. (2019). Do people who feel connected to nature do more to protect it? A meta-analysis. *Journal of Environmental Psychology*, 65, 101323. <https://doi.org/10.1016/j.jenvp.2019.101323>
- Mancha, R. M., & Yoder, C. Y. (2015). Cultural antecedents of green behavioral intent: An environmental theory of planned behavior. *Journal of Environmental Psychology*, 43, 145-154. <https://doi.org/10.1016/j.jenvp.2015.06.005>
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98, 224-253. <https://doi.org/10.1037/0033-295X.98.2.224>
- Markus, H. R., & Kitayama, S. (2010). Cultures and selves: A cycle of mutual constitution. *Perspectives on Psychological Science*, 5, 420-430. <https://doi.org/10.1177/1745691610375557>


- Matsumoto, D. (1999). Culture and self: An empirical assessment of Markus and Kitayama's theory of independent and interdependent self-construals. *Asian Journal of Social Psychology*, 2, 289-310. <https://doi.org/10.1111/1467-839X.00042>
- Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of Environmental Psychology*, 24, 503-515. <https://doi.org/10.1016/j.jenvp.2004.10.001>
- Milfont, T. L. (2005). Factorial structure of the self-construal scale: Testing alternative models. *Estudos de Psicologia*, 22, 277-290. <http://dx.doi.org/10.1590/S0103-166X2005000300006>
- Milfont, T. L. (2012). The psychology of environmental attitudes: Conceptual and empirical insights from New Zealand. *Ecopsychology*, 42, 269-276. <https://doi.org/10.1089/eco.2012.0058>
- Milfont, T. L., Bain, P. G., Kashima, Y., Corral-Verdugo, V., Pasquali, C., Johansson, L. O., ... & Bilewicz, M. (2018). On the relation between social dominance orientation and environmentalism: A 25-nation study. *Social Psychological and Personality Science*, 9, 802-814. <https://doi.org/10.1177/1948550617722832>
- Milfont, T. L., Duckitt, J., & Cameron, L. (2006). A cross-cultural study of environmental motive concerns and their implications for proenvironmental behavior. *Environment and Behavior*, 38, 745-767. <https://doi.org/10.1177/0013916505285933>
- Milfont, T. L., Wilson, M. S., & Sibley, C. G. (2017). The public's belief in climate change and its human cause are increasing over time. *PloS One*, 12, e0174246. <https://doi.org/10.1371/journal.pone.0174246>
- Milfont, T. L., & Markowitz, E. (2016). Sustainable consumer behavior: A multilevel perspective. *Current Opinion in Psychology*, 10, 112-117. <https://doi.org/10.1016/j.copsyc.2015.12.016>
- Milfont, T. L., & Schultz, P. W. (2016). Culture and the natural environment. *Current Opinion in Psychology*, 8, 194-199. <https://doi.org/10.1016/j.copsyc.2015.09.009>
- Milfont, T. L., & Schultz, P. W. (2018). The role of attitudes in environmental issues. In D. Albarracín & B. T. Johnson (Eds.), *The Handbook of Attitudes, Volume 2: Applications* (Chapter 11, pp. 337-363). New York: Routledge. <https://doi.org/10.4324/9781315178080-11>
- Nolan, J. M., & Schultz, P. W. (2015). Prosocial behavior and environmental action. In D. Schroeder & W. Graziano (Eds.), *The Oxford handbook of prosocial behavior* (pp.

- 626-652). Oxford: Oxford University Press.  
<https://doi.org/10.1093/oxfordhb/9780195399813.013.011>
- Owe, E. (2012). *Unpacking cultural orientations: Representations of the person and the self*. Unpublished doctoral dissertation, University of Sussex, Brighton, UK.
- Owe, E., Vignoles, V. L., Becker, M., Brown, R., Smith, P. B., Lee, S. W., ... & Baguma, P. (2013). Contextualism as an important facet of individualism-collectivism: Personhood beliefs across 37 national groups. *Journal of Cross-Cultural Psychology, 44*, 24-45. <https://doi.org/10.1177/0022022111430255>
- Oyserman, D., & Lee, S. W. S. (2008). Does culture influence what and how we think? Effects of priming individualism and collectivism. *Psychological Bulletin, 134*(2), 311-342. <https://doi.org/10.1037/0033-2909.134.2.311>
- Peters, G. (2018). *Userfriendlyscience: Quantitative analysis made accessible*. R package <http://doi.org/10.17605/osf.io/txequ>
- Postmes, T., Rabinovich, A., Morton, T., & Van Zomeren, M. (2014). Toward sustainable social identities: Including our collective future into the self-concept. In H. C. M. van Trijp (Ed.), *Encouraging sustainable behavior: Psychology and the environment* (pp. 185-202). New York, NY: Psychology Press.
- R Core Team (2013). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. Retrieved from <http://www.R-project.org/>.
- Schultz, P. W. (2001). The structure of environmental concern: Concern for self, other people, and the biosphere. *Journal of Environmental Psychology, 21*, 327-339.  
<https://doi.org/10.1006/jevp.2001.0227>
- Schultz, P. W. (2002). Inclusion with nature: The psychology of human-nature relations. In P. Schmuck & W. P. Schultz (Org.), *Psychology of sustainable development* (pp. 61-78). Norwell, Massachusetts: Kluwer Academic Publishers.
- Schwartz, S. H. (2007). Value orientations: Measurement, antecedents and consequences across nations. In R. Jowell, C. Roberts, R. Fitzgerald, & G. Eva (Eds.), *Measuring attitudes cross-nationally: Lessons from the European Social Survey*. Thousand Oaks, CA: Sage Publications, Inc.
- Schwartz, S. H. (2012). An overview of the Schwartz theory of basic values. *Online readings in Psychology and Culture, 2*, 11. <https://doi.org/10.9707/2307-0919.1116>

- Schwartz, S. H., & Bardi, A. (2001). Value hierarchies across cultures: Taking a similarities perspective. *Journal of Cross-Cultural Psychology, 32*(3), 268-290.  
<https://doi.org/10.1177/0022022101032003002>
- Schwartz, S. H., Cieciuch, J., Vecchione, M., Torres, C., Dirilem-Gumus, O., & Butenko, T. (2017). Value tradeoffs and behavior in five countries: Validating 19 refined values. *European Journal of Social Psychology, 47*(3), 241-258.  
<http://dx.doi.org/10.1002/ejsp.2228>
- Singelis, T. M. (1994). The measurement of independent and interdependent self-construals. *Personality and Social Psychology Bulletin, 20*, 580-591.  
<https://doi.org/10.1177/0146167294205014>
- Smith, P. B., Ahmad, A. H., Owe, E., Celikkol, G. C., Ping, H., Gavreliuc, A., ... & Vignoles, V. L. (2016). Nation-level moderators of the extent to which self-efficacy and relationship harmony predict students' depression and life satisfaction: Evidence from 10 cultures. *Journal of Cross-Cultural Psychology, 47*(6), 818-834.  
<https://doi.org/10.1177/0022022116648210>
- Smith, P. B., Easterbrook, M. J., Al-Selim, H., Lun, V. M. C., Koc, Y., Gul, P., ... & Chobthamkit, P. (2020). Sex differences in self-construal and in depressive symptoms: Predictors of cross-national variation. *Journal of Cross-Cultural Psychology, 51*(7-8), 616-635. <https://doi.org/10.1177/0022022120939655>
- Smith, P. B., Vignoles, V. L., Becker, M., Owe, E., Easterbrook, M. J., Brown, R., ... & Yuki, M. (2016). Individual and cultural-level components of survey response styles: A multi-level analysis using cultural models of selfhood. *International Journal of Psychology, 51*, 453-463. <https://doi.org/10.1002/ijop.12293>
- Soga, M., & Gaston, K. J. (2016). Extinction of experience: The loss of human–nature interactions. *Frontiers in Ecology and the Environment, 14*, 94-101.  
<https://doi.org/10.1002/fee.1225>
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology, 29*, 309-317.  
<https://doi.org/10.1016/j.jenvp.2008.10.004>
- Stern, P. C., & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues, 50*, 65-84. <https://doi.org/10.1111/j.1540-4560.1994.tb02420.x>
- Stern, P. C., Dietz, T., & Kalof, L. (1993). Value orientations, gender, and environmental concern. *Environment and behavior, 25*, 322-348.  
<https://doi.org/10.1177/0013916593255002>

- Stroink, M., & DeCicco, T. (2011). Culture, religion, and the underlying value dimensions of the metapersonal self-construal. *Mental Health, Religion & Culture, 14*, 917-934. <https://doi.org/10.1080/13674676.2010.536979>
- Taras, V., Sarala, R., Muchinsky, P., Kemmelmeier, M., Singelis, T. M., Avsec, A., ... & Hardin, E. E. (2014). Opposite ends of the same stick? Multi-method test of the dimensionality of individualism and collectivism. *Journal of Cross-Cultural Psychology, 45*, 213-245. <https://doi.org/10.1177/0022022113509132>
- The jamovi project (2019). *jamovi* (Version 0.9) [Computer Software]. Retrieved from <https://www.jamovi.org>
- Vignoles, V. L. (2018). The “common view”, the “cultural binary”, and how to move forward. *Asian Journal of Social Psychology, 21*, 336-345. <https://doi.org/10.1111/ajsp.12346>
- Vignoles, V. L., & Brown, R. (2011). *Motivated identity construction in cultural context* (ESRC End of Award Report, RES-062–23-1300). Swindon, UK: ESRC.
- Vignoles, V. L., Owe, E., Becker, M., Smith, P. B., Easterbrook, M. J., Brown, R., ... & Lay, S. (2016). Beyond the ‘east–west’ dichotomy: Global variation in cultural models of selfhood. *Journal of Experimental Psychology: General, 145*, 966-1000. <https://doi.org/10.1037/xge0000175>
- Vignoles, V. L., Smith, P. B., Becker, M., & Easterbrook, M. J. (2018). In search of a pan-European culture: European values, beliefs, and models of selfhood in global perspective. *Journal of Cross-Cultural Psychology, 49*(6), 868-887. <https://doi.org/10.1177/0022022117738751>
- Whitburn, J., Linklater, W., & Abrahamse, W. (2020). Meta-analysis of human connection to nature and proenvironmental behavior. *Conservation Biology, 34*, 180-193. <https://doi.org/10.1111/cobi.13381>
- Wickham, H. (2017). tidyverse: Easily Install and Load the 'Tidyverse'. R package version 1.2.1. <https://CRAN.R-project.org/package=tidyverse>
- Yang, S. (2018). *Multidimensional self-construals: Testing the model and refining measurement* Unpublished doctoral dissertation, University of Sussex, Brighton, UK.
- Yang, S., & Vignoles, V. L. (2020). Self-construal priming reconsidered: Comparing effects of two commonly used primes in the UK and China. *Open Science Journal, 5*(3). <https://doi.org/10.23954/osj.v5i3.2418>
- Zhou, N., Huang, J., & Wei, T. (2017). Interactive effects of perceived social exclusion and self-construal on recycling behavior. *Social Behavior and Personality, 45*, 491-503. <https://doi.org/10.2224/sbp.6146>

**Table 1.** The seven dimensions of self-construal identified by Vignoles et al. (2016), with illustrative scale items scored in each direction.

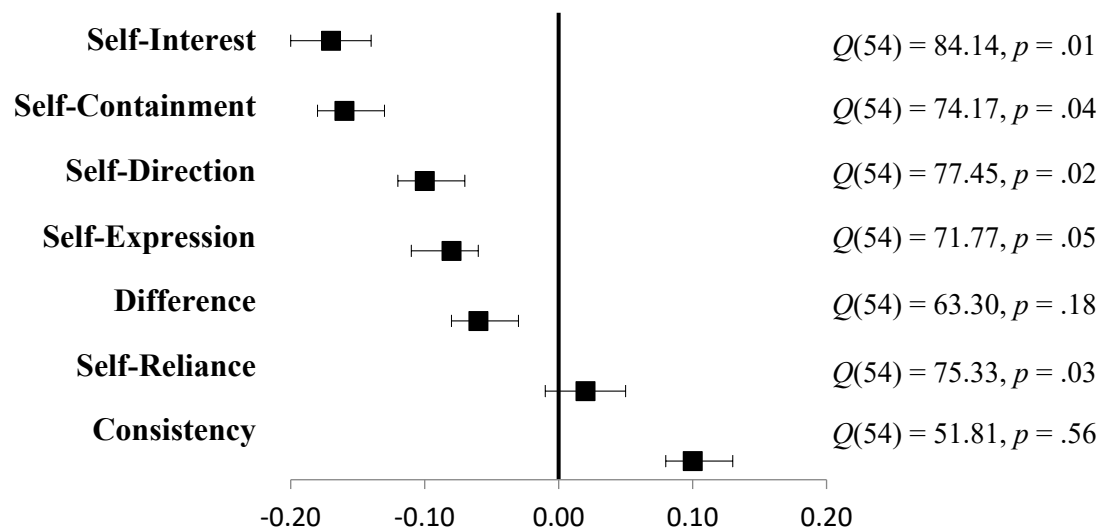
| Domain of functioning              | Independent pole                 | Interdependent pole  |
|------------------------------------|--|--|
| Defining the self                  | <b>Difference</b><br>(e.g., "You see yourself as unique and different from others.")                               | <b>Similarity</b><br>(e.g., "Being different from others makes you feel uncomfortable.")   |
| Experiencing the self              | <b>Self-containment</b><br>(e.g., "Your happiness is unrelated to the happiness of your family.")                  | <b>Connectedness to others</b><br>(e.g., "If someone in your family is sad, you feel the sadness as if it were your own.")           |
| Making decisions                   | <b>Self-direction</b><br>(e.g., "You prefer to do what you want without letting your family influence you.")       | <b>Receptiveness to influence</b><br>(e.g., "You always ask your family for advice before making a decision.")                       |
| Looking after oneself              | <b>Self-reliance</b><br>(e.g., "You prefer to rely completely on yourself rather than depend on others.")          | <b>Dependence on others</b><br>(e.g., "You prefer to ask other people for help rather than rely only on yourself.")                  |
| Moving between contexts            | <b>Consistency</b><br>(e.g., "You behave the same way at home and in public.")                                     | <b>Variability</b><br>(e.g., "You see yourself differently in different social environments.")                                       |
| Communicating with others          | <b>Self-expression</b><br>(e.g., "You show your inner feelings even if it disturbs the harmony of your group.")    | <b>Harmony</b><br>(e.g., "You try to adapt to people around you, even if it means hiding your inner feelings.")                      |
| Dealing with conflicting interests | <b>Self-interest</b><br>(e.g., "Your own success is very important to you, even if it disrupts your friendships.") | <b>Commitment to others</b><br>(e.g., "You value good relations with the people close to you more than your personal achievements.") |

**Table 2.** Description of the cultural samples

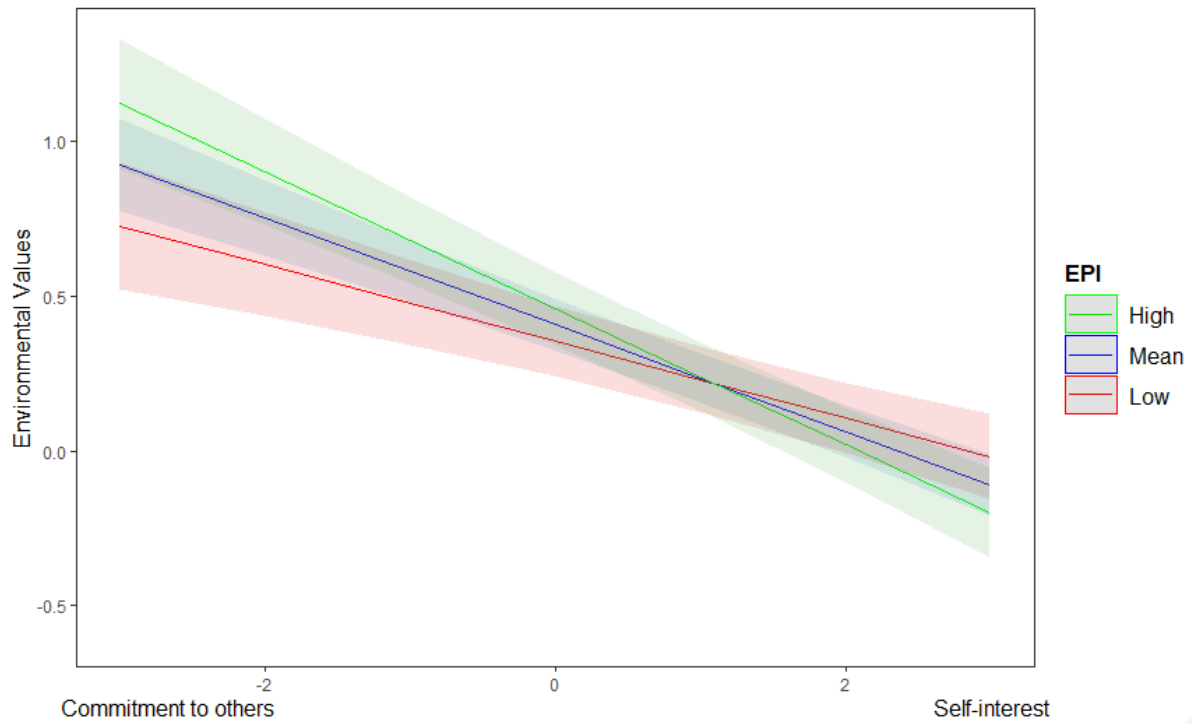
| <b>Culture</b>         | <b><i>N</i></b> | <b>Language</b> | <b><i>M</i><sub>age</sub> (<i>SD</i><sub>age</sub>)</b> | <b>Female %</b> |
|------------------------|-----------------|-----------------|---|-----------------|
| Belgium: High SES      | 185             | French          | 43.78 (8.17)  | 48              |
| Belgium: Low SES       | 178             | French          | 28.75 (9.25)  | 47              |
| Brazil: Central        | 185             | Portuguese      | 33.60 (13.77)   | 44              |
| Brazil: North East     | 150             | Portuguese      | 38.95 (11.66)   | 73              |
| Brazil: South          | 165             | Portuguese      | 25.97 (9.67)  | 56              |
| Cameroon: Bafut        | 100             | English         | 26.07 (6.10)  | 67              |
| Chile: Majority        | 148             | Spanish         | 44.97 (12.46)   | 58              |
| Chile: Mapuche         | 149             | Spanish         | 38.16 (14.83)   | 55              |
| China: East            | 125             | Chinese         | 31.66 (8.27)  | 69              |
| China: West            | 135             | Chinese         | 31.15 (8.70)  | 68              |
| Colombia: Rural        | 150             | Spanish         | 35.23 (13.37)   | 62              |
| Colombia: Urban        | 149             | Spanish         | 38.72 (11.52)   | 60              |
| Egypt                  | 164             | Arabic          | 31.12 (9.98)  | 52              |
| Ethiopia: Highlanders  | 150             | Amharic         | 33.11 (9.23)  | 38              |
| Ethiopia: Urban        | 150             | Amharic         | 35.02 (9.00)  | 46              |
| Georgia: Baptists      | 81              | Georgian        | 44.85 (17.27)   | 75              |
| Georgia: Orthodox      | 138             | Georgian        | 39.16 (12.08)   | 45              |
| Germany: East          | 153             | German          | 40.26 (14.73)   | 58              |
| Germany: West          | 104             | German          | 39.71 (15.74)   | 58              |
| Ghana                  | 116             | English         | 28.58 (5.09)  | 23              |
| Hungary: Majority      | 151             | Hungarian       | 36.83 (12.78)   | 46              |
| Hungary: Roma          | 92              | Hungarian       | 33.37 (11.70)   | 48              |
| Iceland                | 121             | Icelandic       | 35.19 (13.30)   | 69              |
| Italy: Rural           | 90              | Italian         | 40.30 (13.69)   | 72              |
| Italy: Urban           | 83              | Italian         | 37.59 (12.42)   | 69              |
| Japan: Hokkaido        | 73              | Japanese        | 50.87 (12.50)   | 63              |
| Japan: Mainland        | 211             | Japanese        | 41.43 (15.51)   | 60              |
| Lebanon: East Beirut   | 137             | Arabic          | 35.45 (13.28)   | 53              |
| Lebanon: West Beirut   | 123             | Arabic          | 34.76 (14.74)   | 42              |
| Malaysia               | 150             | Malay           | 28.05 (7.92)  | 63              |
| Namibia: Damara>Nama   | 69              | English         | 25.14 (6.40)  | 61              |
| Namibia: Owambo        | 135             | English         | 24.34 (5.30)  | 68              |
| New Zealand: Pākehā    | 204             | English         | 34.91 (13.06)   | 49              |
| Norway                 | 102             | Norwegian       | 37.01 (13.54)   | 57              |
| Oman                   | 160             | Arabic          | 25.12 (4.99)  | 45              |
| Peru: Rural            | 73              | Spanish         | 41.31 (13.47)   | 62              |
| Peru: Urban            | 81              | Spanish         | 30.65 (14.64)   | 52              |
| Philippines: Christian | 151             | English/Tausug  | 32.01 (12.23)   | 52              |
| Philippines: Muslim    | 154             | English/Tausug  | 24.97 (8.82)  | 50              |
| Romania: Rural         | 162             | Romanian        | 37.02 (15.04)   | 59              |
| Romania: Urban         | 318             | Romanian        | 35.18 (12.12)   | 58              |
| Russia: Caucasian      | 139             | Russian         | 32.06 (11.75)   | 81              |
| Russia: Russian        | 122             | Russian         | 29.43 (12.33)   | 76              |
| Singapore              | 110             | English         | 34.95 (12.74)   | 54              |
| Spain: Rural           | 75              | Spanish         | 38.61 (16.14)   | 47              |
| Spain: Urban           | 105             | Spanish         | 41.16 (13.39)   | 55              |
| Sweden                 | 101             | Swedish         | 45.18 (16.01)   | 65              |
| Thailand               | 71              | Thai            | 27.99 (6.71)  | 69              |
| Turkey: Alevi          | 114             | Turkish         | 38.88 (11.02)   | 64              |
| Turkey: Majority       | 134             | Turkish         | 40.62 (9.94)  | 57              |
| Uganda: Baganda        | 151             | English         | 34.45 (6.31)  | 58              |
| UK: Rural              | 95              | English         | 51.82 (16.50)   | 72              |
| UK: Urban              | 133             | English         | 43.92 (17.43)   | 62              |
| US: Colorado           | 92              | English         | 36.77 (13.74)   | 59              |
| US: Miami (Hispanics)  | 122             | Spanish         | 23.49 (5.34)  | 71              |

**Table 3.** Multilevel model showing fixed effects for the model including all self-construal dimensions predicting endorsement of environmental values

| Predictor variables   | Null Model |           |           |
|-----------------------|------------|-----------|-----------|
|                       | $\gamma$   | <i>SE</i> | <i>t</i>  |
| Level 1 Fixed effects |            |           |           |
| Intercept             | .469       | .014      | 33.435*** |
| Difference            | -.034      | .018      | -2.135*   |
| Self-containment      | -.108      | .031      | -3.482*** |
| Self-direction        | .074       | .029      | 2.601**   |
| Self-reliance         | .001       | .020      | .067      |
| Consistency           | .072       | .016      | 4.434***  |
| Self-expression       | -.022      | .021      | -1.076    |
| Self-interest         | -.092      | .020      | -4.706*** |



**Figure 1.** Forest plot of the average correlation between seven-dimensions of self-construal and environmental values across 55 cultures. Each dimension has been labelled by the independent pole (see Table 1 for the interdependent pole). Error bars represent the 95% confidence interval for each correlation. Q-statistics provides indication of heterogeneity for each correlation across the cultures.



**Figure 2.** Slopes for the negative association between self-interest (vs. commitment to others) and endorsement of environmental values at different levels of the Environmental Performance Index. High and low scores for EPI represent one standard deviation above and below the mean, respectively ( $N = 7,069$ ,  $k = 33$ ).

