

# Public views of the Sustainable Development Goals across countries

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**The United Nation's 17 Sustainable Development Goals (SDGs) offer an extensive framework for coordinating and shaping government policies, and for engaging the public with sustainability. Public understanding of the SDGs and sustainability can influence this engagement, as people are more likely to accept and share information consistent with their own understanding. We identify public understandings of SDGs through mental maps of how people relate the SDGs to environmental, social and economic sustainability. Using responses from 12 developed/developing countries ( $n = 2,134$ ), we identified four mental maps that varied mainly on two dimensions, which diverged from some expert models. Some people's mental maps identified tension between achieving environmental versus social sustainability, whereas for others the tension was between economic sustainability and the other two sustainability elements. Some people related different SDGs to each element of sustainability, whereas others saw all SDGs as targeting the same sustainability element(s). These findings highlight opportunities and challenges to engage the public with sustainability more effectively, especially with wide-ranging initiatives such as a Green New Deal. We observed cultural differences but we also identified a dominant mental map across countries that could serve as a default model for communicating sustainability internationally.**

A critical global challenge is to ensure that current and future generations experience the social and economic conditions that allow them to lead fulfilling lives without degrading the natural environment. Combining the social/economic concept of development with the more ecological concept of sustainability<sup>1</sup>, the United Nations developed the 17 Sustainable Development Goals (SDGs)<sup>2</sup> to coordinate national and international policies and agreements to achieve an environmentally, socially and economically sustainable world<sup>3–5</sup>.

The SDGs are not just for policymaking—they are also intended as a framework for public communication, stakeholder engagement and outreach to promote sustainability<sup>6</sup>. Increasing public engagement and support are important to increase adoption of sustainable technologies and initiatives<sup>7</sup> and sustainability programmes, and to increase public pressure to hold authorities and businesses to account for delivering sustainable outcomes<sup>8</sup>.

Substantial efforts have been devoted to how policymakers should understand and use the SDGs to improve policy development<sup>9–15</sup>. Yet we know little about how the public perceives sustainability, at least beyond specific issues such as climate change<sup>16</sup>. Understanding public views about the SDGs can inform sustainability communication, showing which messages are more likely to be accepted by the public and shared with others. This is because people view information that is consistent with their own beliefs as more appealing and credible<sup>17,18</sup> and such information is more likely to spread through social networks<sup>19,20</sup>.

While we have some information about the priorities assigned to SDGs on average<sup>21</sup>, we lack a deeper understanding of people's 'mental maps' of sustainability. We use mental map to denote a

visual representation of cognitive associations between constructs, in this case how people relate each SDG to the achievement of environmental, social and economic sustainability. For example, SDG7 (Affordable and Clean Energy) might be seen as primarily targeting people's wellbeing (social), financial security (economic) or the health of the natural world (environmental); or all three equally. Knowing what people think about what the SDGs are supposed to achieve can help practitioners promote sustainable energy policies and initiatives, by framing them in ways consistent with public views.

People's mental maps of sustainability reveal which SDGs are seen to be in tension, where pursuing some SDGs competes with attention to others. For example, if people believe pursuing SDG13 (Climate Action) is in tension with SDG8 (Decent Work and Economic Growth), this can be a hurdle for convincing the public to accept green industries. Those who see them as aligned, however, may respond positively to green industry initiatives. This knowledge about the relationships between SDGs can highlight where to refine sustainability communication to highlight alignments and to downplay or address tensions.

Some models in the literature on sustainability emphasize alignment between social and environmental elements, with one or both contrasted with economic productivity<sup>12,22,23</sup>. However, it is unclear whether this distinction is common among people or whether they view the relations of these sustainability elements differently. For instance, it may be more common to see social and economic sustainability as aligned and in competition with sustainable environmental outcomes. Identifying mental maps offers insights into these public perceptions of sustainability.

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**Table 1 | Definitions of sustainability elements used in the study**

Sustainability element	Description
<b>Environmental</b>	Environmental sustainability refers to <b>maintaining the viability and health of the natural world</b> (including animals and plants) in wilderness, rural and urban areas over time. This includes using renewable environmental resources, using non-renewable resources in ways that their use can continue until renewable substitutes are found and controlling pollution to levels that the Earth can process.
<b>Social</b>	Social sustainability refers to providing an <b>acceptable level of wellbeing and quality of life for all people</b> in society over time. This includes governments and institutions acting to minimize destructive conflicts, to ensure that there are acceptable levels of fairness, opportunity and diversity in society, and providing support to meet people's basic needs for health and wellbeing.
<b>Economic</b>	Economic sustainability refers to governments, businesses and individuals <b>managing finances efficiently and responsibly to promote productive economic activity now and into the future</b> . This includes investing in activities likely to produce enduring positive results, avoiding activities that are likely to hamper long-term productivity (for example, avoiding excessive debt and interest payments), and making optimal use of available resources.

Boldfaced parts of descriptions were boldfaced in the survey.

Hence, our goal was to understand mental maps of sustainability and how they vary among people. Some people's mental maps could be straightforward, believing all SDGs are focused only on environmental (or social or economic) sustainability. Other people could draw clear distinctions between SDGs, where some are focused on the environment, others on people's wellbeing and others on the economy.

Mental maps could also vary across countries with differing socio-economic conditions. Some argue that environmental sustainability may be less prominent in developing economies than in developed economies<sup>24</sup>, with developing economies placing more emphasis on social or economic sustainability. Therefore, we aimed to identify the mental maps held in both economically developed and developing countries.

To identify mental maps, we used a survey company to obtain participants from their national panels in 12 developed and developing countries (final  $n = 2,134$ ; for demographic details and exclusions, see Supplementary Methods 1 and 2). On separate survey pages, participants read definitions of environmental, economic or social sustainability elements (also called three 'pillars' of sustainability<sup>3</sup>; see Table 1) followed by descriptions of each SDG without labels (Table 2). They rated the extent to which each SDG was targeted at achieving each sustainability element on a 7-point scale (1, not at all; 4, moderately; 7, very much). Presentation order of sustainability elements and SDG descriptions was randomized.

To understand who holds different views we also obtained information about their demographics and their life-guiding principles (values<sup>25</sup>), which are known to influence attitudes to environmental sustainability issues such as climate change<sup>26</sup>. To identify if some mental maps were more pro- or anti-sustainability, we also measured the priority they thought should be given to sustainability in their country.

Identifying these mental maps requires simultaneous analysis across three dimensions (or modes): SDGs, the three sustainability elements and participants. For this we used three-mode principal component analysis<sup>27,28</sup> (described in Supplementary Note 3). This version of principal component analysis aims to identify systematic patterns in how SDGs and sustainability elements are related, while allowing these relationships to differ across participants. We focused on patterns of relationships between SDGs and sustainability elements, rather than on people's overall degree of endorsement about whether SDGs target sustainability. Accordingly, we removed each person's average rating of the goals across sustainability elements (centring).

## Results

A model with four components for participants (mental maps) provided the best trade-off between model simplicity and model

fit, explaining 42% of the variation in ratings (model selection is explained in Supplementary Note 4). Each mental map could be represented using two dimensions.

The existence of four mental maps indicates that there was no single public view of sustainability. However, one mental map was dominant, accounting for over half (52%) of the explained variation and endorsed by most participants in every country. Shown in Fig. 1, the arrows represent the three sustainability elements—for interpretation their direction is most important (their length indicates the relative amount of variance explained) and the SDGs are represented by points. Relations between SDGs and sustainability elements are determined by projecting the point for an SDG orthogonally onto the line for a sustainability element—the further from the origin (0,0) this projection is on the positive side (solid arrow), the stronger the SDG is seen to target that sustainability element. An orthogonal projection on the negative side (represented by dashed arrows in Fig. 1), means that the SDG is seen to target a sustainability element relatively weakly.

These relationships are illustrated for SDG14 (Oceans) in Fig. 1. Projections are shown using dashed line from the point representing oceans to the arrows for each sustainability element. These show that oceans was seen to target environmental sustainability more strongly than all other SDGs (intersecting with the solid green arrow furthest from the origin) and was least relevant to achieving both social sustainability (dashed blue arrow) and economic sustainability (dashed grey arrow). Using the same approach, it can be seen that SDG5 (Gender) was targeted more than all other SDGs at economic and social sustainability and least at environmental sustainability. To aid interpretation, coloured ellipses show the SDGs that targeted each sustainability element more strongly than average. For all mental maps, most variance was explained by the first dimension (horizontal axis) so this axis is the most important for interpretation.

Figure 1 shows that the dominant mental map reflects a primary tension between environmental and social sustainability, as shown by their arrows pointing in opposing directions. That is, SDGs seen to focus more on improving the viability of the natural world were seen to be less targeted at improving people's wellbeing/quality of life (and vice versa). Economic sustainability was a largely independent consideration (orthogonal to the other two elements), consistent with some economic analyses demonstrating that environmental and economic sustainability can be achieved independently<sup>12</sup>.

In this mental map, most SDGs were seen to target either environmental or social sustainability, with only SDG7 (Energy) targeting both. Most SDGs were seen as less relevant to achieving economic sustainability (negative loadings), even those ostensibly with an economic focus such as SDG9 (infrastructure), for which social sustainability was more relevant. This suggests that achieving most SDGs

**Table 2 | Descriptions of the SDGs used in the study**

SDG	UN label	Short label	Description used in study
1	No Poverty	Poverty	End poverty in all its forms everywhere.
2	Zero Hunger	Hunger	End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
3	Good health and Wellbeing	Health	Ensure healthy lives and promote wellbeing for all, at all ages.
4	Quality Education	Education	Ensure inclusive and equitable quality education and lifelong learning opportunities for all.
5	Gender Equality	Gender	Achieve gender equality and empower all women and girls.
6	Clean Water and Sanitation	Water	Ensure availability and sustainable management of water and sanitation for all.
7	Affordable and Clean Energy	Energy	Ensure access to affordable, reliable, sustainable and modern energy for all.
8	Decent Work and Economic Growth	Growth	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
9	Industry, Innovation and Infrastructure	Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
10	Reduced Inequalities	Equality	Reduce inequality in and among countries.
11	Sustainable Cities and Communities	Cities	Make cities and human settlements inclusive, safe, resilient and sustainable.
12	Responsible Consumption and Production	Consumption	Ensure sustainable consumption and production patterns.
13	Climate Action	Climate	Take urgent action to combat climate change and its impacts.
14	Life Below Water	Oceans	Conserve and sustainably use the oceans, seas and marine resources.
15	Life on Land	Land	Protect, restore and promote sustainable use of ecosystems, including manage forests, combat desertification, reverse land degradation and halt biodiversity loss.
16	Peace, Justice and Strong Institutions	Peace	Promote peaceful and inclusive societies, including providing access to justice for all and building effective, accountable institutions.
17	Partnerships for the Goals	Partnerships	Strengthen global efforts and partnerships for achieving sustainable development.

is seen to come at some cost to economic sustainability, except for a small set where social and economic sustainability are aligned (including equality, growth, education, peace and reducing poverty).

Although the dominant mental map in Fig. 1 was common across countries, it was held more strongly in Russia than in all other countries, consistent with a view identified in economic and qualitative research that Russians view environmental protection and social wellbeing as conflicting<sup>29,30</sup>. This mental map was also more prominent in the Americas (USA, Brazil and Argentina) than in China and France, and stronger in Brazil than in India. These differences did not correspond to established dimensions of cultural variability<sup>31</sup> (for example, individualism–collectivism) or economic development, suggesting that these effects are specific to each country rather than reflecting broader cultural dimensions.

There were also demographic and value differences (for detailed analyses, see Supplementary Note 5). Overall, meta-analyses of relationships across countries showed that this dominant mental map was held more strongly by younger participants, females and the less religious. It was not related to political orientation overall (despite the political divide on sustainability issues such as climate change<sup>32,33</sup>), although cross-cultural variation was identified—this mental map was held by more left-wing participants in the United Kingdom/France but by more right-wing participants in Russia. On values, this mental map was held more strongly by those with higher concern for others' welfare (benevolence) and who value novelty and challenge (self-direction) but was less prevalent for those who value control and dominance (power), stability and the status quo (tradition, conformity), and excitement and pleasure (hedonism, stimulation).

This dominant mental map is shown with the other mental maps in Fig. 2. While there were only four participant components, this figure has eight panels to show the patterns for those with positive

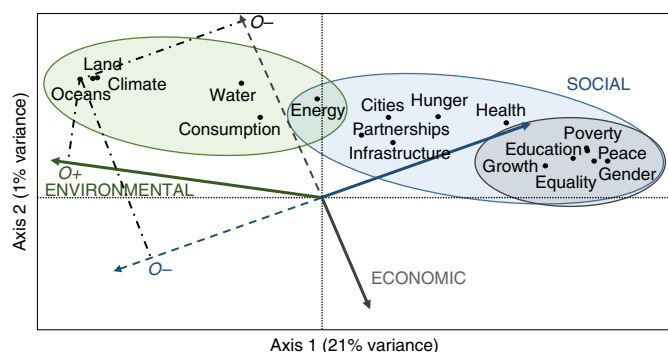
or negative scores for each component. For participants with negative component scores the associations between SDGs and sustainability elements are reversed, achieved in Fig. 2 by reversing the direction of the arrows for sustainability elements.

While each mental map tells an informative story, here we focus on the two simpler distinctions that differentiate these maps (for more detail on each mental map, see Supplementary Note 6). The first distinction, which we label 'primary contrast' in Fig. 2, involves how sustainability elements were contrasted (indicated by arrow directions). On the left side of Fig. 2 (mental maps 1 and 3; accounting for almost 70% of explained variation), participants saw a tension between environmental and social sustainability—more focus on the health of the natural world means less focus on human wellbeing (and vice versa), with economic sustainability not strongly related to either of the other elements.

In contrast, the right side of Fig. 2 (mental maps 2 and 4; accounting for about 30% of explained variation) shows a primary contrast between economic and social/environmental sustainability—more focus on sustained economic productivity means less focus on achieving a healthy natural world or human wellbeing. This minority view fits more closely with some expert models of sustainability that contrast the economy and the environment<sup>12,22,23</sup>.

The second distinction is in how the SDGs were aligned with sustainability elements. In the top half of Fig. 2 (mental maps 1 and 4; 60% of explained variation), different SDGs were seen to target different sustainability elements but differ in which element is targeted. For example, in these mental maps SDG13 (Climate) was seen to target environmental sustainability (Fig. 2a), economic sustainability (Fig. 2c), both social and economic sustainability (Fig. 2b), or both environmental and social sustainability (Fig. 2d).

In the bottom half of Fig. 2 (mental maps 3 and 2; 40% of explained variation) all SDGs targeted the same element(s).



**Fig. 1 | The dominant mental map relating SDGs to sustainability elements.**

The plot is rotated so that the maximum variance is shown on the horizontal axis. SDGs and sustainability elements were transformed to have similar scales (symmetric scaling) so that their relationships can be seen more easily; hence, axis values are not inherently meaningful and were omitted. SDGs are shown as points and sustainability elements as arrows (positive direction, solid lines; negative direction, dotted lines). Projecting SDG points orthogonally onto sustainability element arrows shows their correspondence—intersecting with the solid line means they are associated with a sustainability element more strongly than average and with a dotted line more weakly than average (negative direction). This is illustrated for SDG14 (Oceans), which had the strongest association with environmental sustainability of all SDGs and the weakest associations with social and economic sustainability. To help interpretation, ellipses show where SDGs target a sustainability element more strongly than average.

Participants used one or two sustainability elements as a ‘lens’ for all SDGs but differed in the lens(es) used. These lenses showed a socio-centric focus, with all SDGs seen to target only social sustainability (Fig. 2e) or economic sustainability (Fig. 2h) but using environmental sustainability as a lens only in conjunction with social (Fig. 2g) or economic (Fig. 2f) sustainability. This is notable because there is a tendency to see sustainability issues mainly through an environmental lens<sup>22,34,35</sup> (illustrated by the title of a prominent journal *Environment: Science and Policy for Sustainable Development*), especially for climate change<sup>32,36,37</sup>.

Mental maps 2–4 showed no reliable demographic or value associations and only one country difference. For mental map 2, scores were more negative in Russia than in Brazil or the United Kingdom, indicating that Russians saw all SDGs as more focused on economic sustainability (reflecting a high priority on economic issues in sustainability noted by others<sup>30</sup>) and Brazilians/British saw all SDGs as more focused on social/environmental sustainability. While this study provided few indications about the characteristics associated with these mental maps, other demographics (for example, education) or psychological factors (for example, worldviews<sup>38</sup>) could be relevant.

Participants could have high scores on more than one component, for whom the mental maps are building blocks for understanding these more complex beliefs. To illustrate, participants with high positive scores only on mental map 1 (Fig. 2a) primarily distinguished SDGs on environmental or social sustainability and saw economic sustainability as less relevant but those who also had high positive scores on mental map 2 (Fig. 2h) showed the economic–social sustainability distinction but also believed that the SDGs targeted economic sustainability.

To understand if these mental models were associated with the priority people give to achieving sustainable development, we introduced participants to the concept of gross domestic product (GDP) as an indicator of national priorities, and asked them to specify the percentage of their country’s GDP that should be devoted to achiev-

ing the SDGs. Responses ranged from 0 to 100% and were lowest in Russia ( $m=27$ ,  $s.d.=22$ ) and highest in South Korea ( $m=45$ ,  $s.d.=19$ ). Meta-analyses showed no overall relationship between this measure and any mental map, with cross-country variation observed only for mental map 2 (see Supplementary Note 7). While this broad measure assesses only one aspect of sustainability support, it suggests that these mental maps are alternative perspectives on sustainability rather than reflecting pro- or anti-sustainability views.

## Discussion

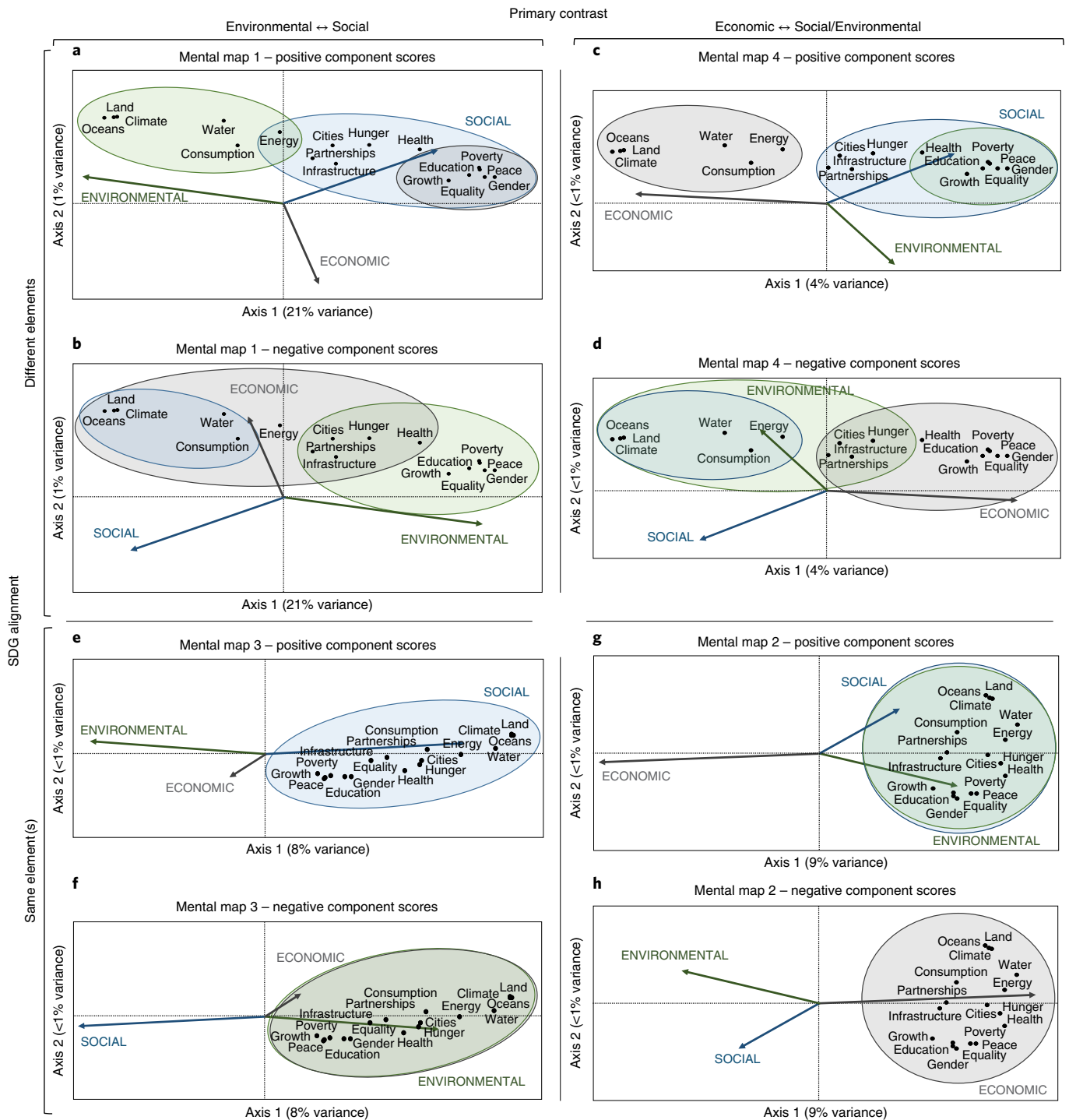
This mapping of cultural views of the SDGs and sustainability provides knowledge to improve public engagement with sustainability. On the basis of these findings we make the following recommendations, with the caveat that samples in each country were relatively small and would benefit from expanding the research to larger representative samples in these and other countries.

Our findings indicate that a multifaceted strategy could engage people with a broader range of sustainability issues. For a substantial proportion of participants, each SDG targeted environmental, social or economic sustainability. Because people are more receptive to communication that fits their beliefs, sustainability communication could improve by moving beyond targeting the obvious elements (for example, environmental sustainability for climate change, social sustainability for equality). For example, communication about SDG4 (Education) could highlight how it improves people’s quality of life (social), increases economic productivity (economic) and helps people to understand the importance of preserving the natural world (environmental). This study complements evidence from climate change communication demonstrating that a focus on social or economic outcomes can be as effective as focusing on its environmental effects<sup>39,40</sup>.

The findings also suggest which SDGs will work well together in public communication because they are both directed towards the same sustainability goals. For example, in the dominant mental map both SDG8 (Growth) and SDG5 (Gender) target social and economic sustainability, suggesting that most people would accept the International Monetary Fund’s recent framing that links increased gender equality with stable economic growth<sup>41</sup>. However, it is important that policies and initiatives actually deliver on these outcomes (in this example policy success is equivocal<sup>42</sup>), to ensure that policies do not undermine future communication efforts. Other considerations are also important, such as how the political alignment of communicators could influence reactions (for example, whether messages come from the political left or right).

Close consideration is needed when communicating environmental, social and economic sustainability elements in combination<sup>43</sup>. One issue is whether to present these elements with equal status and emphasis or with the more obvious element as dominant and others as supplementary. The latter approach is common when communicating climate change, where social/economic outcomes are typically framed as co-benefits<sup>44–46</sup>. Yet this might be a less effective frame for people who see the primary outcomes of addressing climate change as social or economic rather than environmental.

A further consideration is how using multiple elements could enhance or undermine persuasiveness. Communicating benefits for multiple sustainability elements could have additive effects through providing extra justifications to support policies. However, where people see these outcomes as in tension, the overall effect may be to undermine support by claiming that they will achieve outcomes that people view as incompatible. Some evidence from climate change communication suggests that such undermining effects may be minimal because people tend to remember and pass on information familiar to them and to filter out the rest<sup>20</sup>. Others have found that individual differences, such as open-mindedness, influence the



**Fig. 2 | Mental maps relating SDGs to sustainability elements, showing relationships for those with positive and negative scores for each of the four participant components. a–h,** Mental maps have been arranged to highlight commonalities and differences. Maps on the left and right reflect the primary contrast people made between sustainability elements—for mental maps on the left (**a,b,e,f**), the primary contrast was between environmental and social sustainability; for those on the right (**c,d,g,h**), the primary contrast was between economic and environmental/social sustainability. Maps in the top and bottom halves differed in how SDGs were aligned with sustainability elements (SDG alignment). In the top half (**a–d**), different SDGs were seen to target different sustainability elements; for example, in panel **a**, SDG14 (Oceans) targets environmental sustainability and SDG3 (Health) targets social sustainability. In the bottom half (**e–h**), all SDGs were seen to target the same element(s) but differed in which element(s) they targeted. Ellipses show where SDGs target a sustainability element more strongly than average.

persuasiveness of these types of messages<sup>47</sup>. The present findings contribute to understanding both considerations through identifying public beliefs about which SDGs are seen as compatible or conflicting in achieving sustainability.

The findings highlight a particular challenge for explicitly all-encompassing sustainability programmes such as the United States’ proposed Green New Deal<sup>48</sup>. While its political opponents have claimed it will have devastating consequences for the economy<sup>49</sup>,

from our findings it appears that the largest challenge in public communication is not a proposal's economic sustainability but to persuade people that it can deliver on both environmental and social outcomes (for example, addressing climate change as well as health or poverty).

Two approaches for overcoming this challenge warrant investigation. The first separates the communication of policies to diminish the salience of the tension. For example, policies to address SDG13 (Climate) and SDG1 (Poverty) could be communicated as separate programmes, even if they are linked in policy development<sup>13,50</sup>. A second approach is to ensure communication (and policies themselves) explicitly addresses these tensions, for example, explaining how addressing climate change will help reduce poverty or create other social co-benefits<sup>44,45</sup>, or how policies to address poverty will have minimal negative (or even positive) impacts on the environment.

For communication in specific countries, we recommend close consideration of the dominant beliefs in each country (see Supplementary Note 5). However, to communicate SDGs to international audiences (where consistency and simplicity of communication may be higher priorities), we recommend working with the dominant model (Fig. 1). This means placing most emphasis on the environmental benefits of healthy ecosystems, the social benefits of infrastructure/innovation, improving health and reducing hunger, and the social and economic benefits of equality and peace.

While there are many considerations for what and how to communicate sustainability beyond audience reactions, understanding people's mental maps provides insights into what is most likely to resonate with the public in diverse societies. This informs efforts to improve public engagement with sustainability and to gain the widest public support to address this crucial global issue.

## Methods

An online survey was completed by 2,671 community participants between 28 February and 19 March 2018, using an online panel administered by Survey Sampling International to its panel database in each country. We sampled from 12 countries (the maximum available in our budget), selected to include developing countries (BRICS countries: Brazil, Russia, India, China and South Africa; adding South Korea and Argentina to extend Asian/South American samples), developed anglophone countries (Australia, United Kingdom and United States) and developed non-anglophone countries (France and Sweden). Survey Sampling International uses diverse methods to source their national panels but the sample was self-selected by participants who chose to do the study (about 200 per country) and cannot be assumed to be fully representative of each country's population. However, using a panel from a single company can reduce biases compared to using different recruitment methods. Surveys were in English for Australia, India, South Africa, United Kingdom and United States, and for all other countries were translated into their major language using parallel- or back-translation.

Participants read short definitions of environmental, social and economic sustainability on separate pages (randomized order), and under each definition were provided with short descriptions of the 17 SDGs (without the labels). Participants rated the extent to which each SDG was targeted at achieving that form of sustainability.

We also asked participants about the priority sustainability should be given in their country, introducing GDP as a proxy measure of the resources in a country that can be used for different purposes. Participants indicated the percentage of their country's GDP that should be directed towards achieving sustainability as a whole. They also were asked to indicate the proportion of their government's budget to achieve the SDGs that should be allocated to each of the 17 SDGs (analysis for this measure is reported only in Supplementary Note 7).

We also obtained ratings of values using the Short Schwartz Value Survey<sup>41</sup>, which is based on the most widely used and cross-culturally validated psychological model of values<sup>25</sup>. Demographic information collected included age, gender, relative income, political orientation, religiosity and rural/urban location. Additional measures not related to the study were included for a cross-cultural validation study (that is, people's worldviews about social change and the ideal prize to win in a lottery).

For analyses, we excluded participants who showed clear evidence of 'flatline' pattern responding—giving an identical rating for the relevance of all 17 SDGs in one or more sustainability elements ( $n = 504$ ). While it is possible that some participants could see all 17 SDGs as relevant to a sustainability element to an identical degree, we took a cautious approach and reasoned that showing

no variation at all across 17 SDGs was more likely to indicate inattention or disengagement with the task (further analysis of these responses is reported in Supplementary Methods 2). As the analysis requires a complete dataset with no missing values, participants with missing values for any SDG on any element were excluded ( $n = 33$ ). This resulted in a final sample of 2,134. Demographic information by country is contained in Supplementary Methods 1.

This research was approved by the Psychology Research Ethics Committee at the Queensland University of Technology (QUT), ethics approval no. 1600000223.

## Data availability

Materials and data are publicly available on the Open Science Framework repository at <https://osf.io/c365a/>.

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### Author contributions

P.G.B. conceived and designed the study, developed the new measures, coordinated data collection, analysed the data in conjunction with P.M.K., wrote the manuscript and wrote most of the Supplementary Information. P.M.K., L.J., T.L.M., C.R.C. and T.K. provided input to the basic study design and measures. L.J., T.L.M., E.B., C.C., C.D., Y.G. and J.P. provided input into cultural considerations of the study and measures, and provided translations of the survey. P.M.K. wrote part of the Supplementary Information. All authors provided feedback on the results and the manuscript.

### Competing interests

The authors declare no competing interests.

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