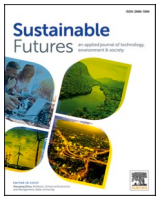
Sustainable Futures 12 (2026) 102253



Contents lists available at ScienceDirect

Sustainable Futures

journal homepage: www.sciencedirect.com/journal/sustainable-futures



Money for (almost) nothing? – Measuring individuals' willingness to externalise costs across space, time, and species

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ARTICLE INFO

Keywords:
Cost externalisation
Gender
Public bads
Spatial and temporal discounting
Sustainable consumer behaviour

ABSTRACT

This study presents the concept of willingness to externalise costs (WTE), defined as the willingness to pass on individually small costs to many other actors for significant personal gain. In the modern world, external costs (in the form of negative environmental or social impacts) frequently arise as a result of everyday consumption decisions, but are often distant from the consumer in space and time. Our study aims to examine how people react if these costs are made explicit. WTE is a measure that can shed light on individuals' attitudes regarding a fundamental element of unsustainable behaviour (cost externalisation), removing the influence of any confounding factors pertaining to specific issues or situations (such as scepticism about climate change, lack of alternatives, distrust in green product claims, etc.). The concept was tested on a sample of 3669 Hungarian undergraduate business students. Our research questions are: (1) To what extent are individuals willing to externalise costs? (2) How does the identity of the suffering party influence WTE? We found that 27% of respondents reject cost externalisation, with a pronounced difference between genders: women generally exhibit a lower WTE, and their answers follow a normal distribution. Conversely, men tend to show a higher willingness to externalise, and their answers are exponentially distributed. We found no difference in WTE across space (passing on costs to people from the same country vs. to people far away), while externalising costs to future individuals and animals was more accepted.

1. Introduction

Imagine if you could gain a large sum of money at the push of a button – and the cost would be spread among so many others that they would barely notice the loss. Would you take the opportunity? What would you do if those having to pay the price were people living on the other side of the world? Or if they had not even been born yet? Or if, instead of people, they happened to be a few thousand hens?

These questions may appear strange, but they arise from the framework in which environmental issues are analysed in economic theory, which is centred around the concept of externalities. Damage to the environment is a negative externality because there is a discrepancy between the private and social costs of the damaging activity – costs are caused to third parties who are not compensated in any way [1]. As Kapp describes the problem, "*it is inevitable that in a market economy dominated by the desire to minimize entrepreneurial costs and to maximize net entrepreneurial returns, social costs and environmental damage tend to be 'externalised' as far as possible within the existing institutional and legal framework, while appropriable monetary benefits (profits) will be internalized*" (quoted by [2]: 320). Nowadays, extra caution is needed because the opportunities for externalisation have increased significantly with technological progress. Externalities appear not only linked to production but also to consumption and consumer behaviour [3]. Affluent consumers today enjoy previously unprecedented levels of individual independence, mobility, dietary choice, convenience, variation and novelty [4] – but the generation of these "products" comes at a very high cost, some of which is externalised, over increasingly long distances across space and time, affecting individuals and ecosystems alike. While economists regard externalities purely from a perspective of market efficiency, if their generation is known and intentional, it also involves a moral aspect [5].

The goal of this study is to examine human behaviour as it relates to the generation of externalities and public bads. We develop a construct to describe and measure people's willingness to make decisions that, while beneficial to themselves, lead to extra costs for others (which we call "the willingness to externalise costs" – WTE), and demonstrate its relevance using a large (N = 3669) sample of university students. We do this by proposing a hypothetical scenario that does not explicitly reference the concept of externalities (which is unknown to most laypeople) or the issue

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https://doi.org/10.1016/j.sftr.2026.102253
Received 24 April 2026; Received in revised form 14 September 2026; Accepted 18 October 2026
Available online 27 October 2026
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of environmental damage but involves quantified gains and losses that lend a clear ethical component to the decision. We believe that examining people's willingness to externalise is highly relevant, as people today are increasingly aware of the negative environmental impacts of everyday consumption decisions such as driving a car, eating meat or purchasing certain products. Indeed, many strategies for promoting pro-environmental behaviour rely on calling attention to the negative consequences, but we know that these strategies are not always effective. We also know that this ineffectiveness can be caused by various factors such as the inadequacies of the communication strategies themselves, or the many other factors that may drive a wedge between knowledge, intentions and actual behaviour [6–8]. What we do not know is to what extent people are even sensitive to the issue of causing costs to others, if these costs are spread among many affected parties, who may be distant from the decision maker. We therefore believe it is necessary to develop a tool to directly examine people's willingness to generate (explicitly known and quantified) public bads for their own benefit.

This paper thus presents two novel elements: (1) directly examining decision making related to the generation of public bads; and (2) examining externalities generated across different relations (across space, time, and species) in a unified behavioural framework. We also investigate the willingness to externalise according to gender, which is a basic demographic variable that has been studied extensively in previous research on public goods [9] as well as green consumption [10] and ethical behaviour [11].

2. Theory

2.1. Cost externalisation and public bads

In the economics literature, environmental issues are typically discussed in the framework of market failures: externalities and public goods [1]. Public goods are goods that are non-rivalrous and non-excludable – if, by their nature, they reduce collective welfare rather than enhancing it, the term public bads is used. Negative externalities, if they are non-rivalrous and non-excludable – which is the case for many kinds of environmental pollution – also represent public bads [12,13]. However, while empirical research on the factors determining individuals' contribution to public goods is extensive (see van Dijk and De Dreu [14] for a review on public goods game experiments), the creation of public bads is rarely studied. Decisions and behaviour related to environmental problems are usually framed as being about public goods provision (for example by LaRiviere et al. [15] and Swallow et al. [16] in relation to biodiversity conservation, and Goeschl et al. [17] and Welsch [18] in relation to climate change mitigation), rather than the avoidance of public bads, which may be a more appropriate understanding.

We know that moral norms, including personal and social norms, play an important role in shaping behaviour towards the environment [19–21] – however, from a moral perspective "doing good" (prescriptive morality) and "not doing bad" (proscriptive morality) may be judged differently, with the latter generally perceived as more mandatory while the former more as a matter of personal preference [22]. This also means that the inhibitors of what is regarded as unethical behaviour can be different from the drivers of positive, ethical actions and vice versa [23].

We also know about the existence of a strong default or status quo bias in human behaviour (a tendency to keep doing things in the current way even when better options might be available – see [24]), which again means that framing pro-environmental behaviour as "improving the environment" (contributing to public goods) versus as "not degrading the environment" (refraining from producing public bads) may produce different reactions. In the first case, the default is behaving and consuming in a way that most people around us are doing, which – at least in high-income countries – is unsustainable, and from this starting point, pro-environmental behaviour such as saving energy or reducing the consumption of animal products can be regarded as "doing good". In the second case, if our starting point is to do no harm, then pro-environmental behaviour itself can become the default and unsustainable practices can be seen as actively "doing bad".

Given these differences, we believe that directly studying decision making related to the generation of public bads may be important as a foundation for understanding behaviour related to the environment.

Based on the above, a conceptual framework for our research is presented in Fig. 1. It shows the relationship of WTE (in the lower right corner) to the more commonly studied issues of public goods provision and free riding, and pro-environmental behaviour. In relation to both public goods and public bads, the individual has the possibility to act in a way that is positive (top row) or negative (bottom row) for others; however, as argued above, there is reason to treat behaviour related to public goods (left) and public bads (right) separately. This results in a matrix with four cells, where the bottom right cell (producing public bads) emerges as a clear research gap that has not been explicitly studied before. In social psychology, the broader construct of social value orientation captures how individuals prefer to allocate resources between themselves and others [25] – WTE can be thought of as a manifestation of this in a specific, new context whose characteristics (losses rather than gains, the high number of affected parties and the distribution of the stakes) may lead to differences from other, better studied settings.

The objective of our research is to fill this gap by introducing and studying the concept of WTE, defined as the willingness to pass on individually small costs to many other actors for significant personal gain. Thus, our first research question is: To what extent are individuals willing to externalise costs?

2.2. Cost externalisation across various relations

The essential characteristic of externalities is that they affect others, not the decision maker – as a result, they are perceived as less important, since people place a greater value on goods accruing to themselves rather than others [26]. Those bearing the costs of negative (environmental) externalities can be many different groups, at varying degrees of distance from the decision maker, and the distance (whether spatial, temporal, or along some other dimension of affinity/relatedness) may affect the extent to which the effect is discounted (see for example Jones and Rachlin [27] on social discounting and Wade-Benzoni and Tost [28] on intergenerational discounting). Bithas ([29]: 1705) divides the parties suffering from environmental externalities into three main categories: (1) "*Individuals who belong to the same institutional setting as those who created the externality.*" (2) "*Individuals of future generations.*" (3) "*Individuals located spatially outside the institutional system of those creating the externality.*" These categories may further be complemented with that of other species, which may also suffer the negative effects of environmental externalities. The classical theory of externalities only considers costs affecting other humans, however, many believe that animals should also be considered, either in their own right [30,31] or because many people exhibit preferences toward their welfare [32].

A large body of research shows that behaviour related to the environment is connected to values such as egoism, altruism and biospherism that reflect the importance that individuals attach to the welfare of other people and non-human beings [33,34]. It can be argued that a sustainable economy requires an ethical basis that includes the well-being of all, including non-human beings, people around the world and future generations [35,36].

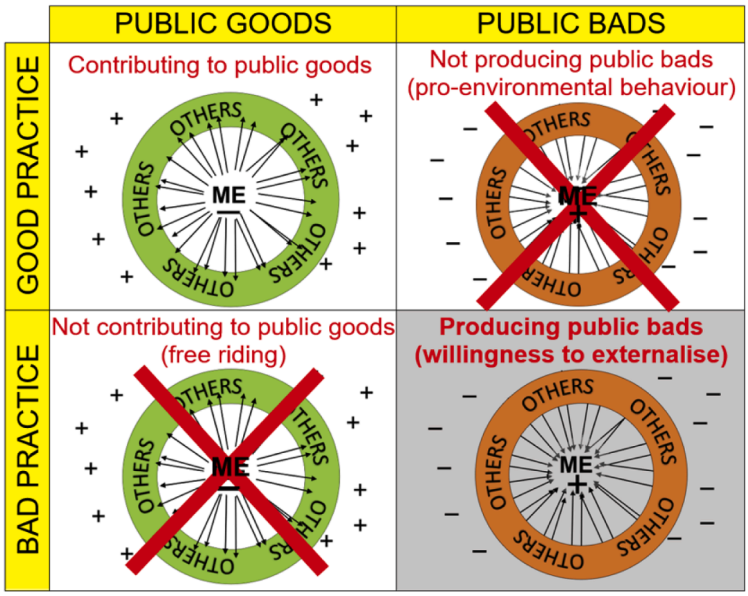


Fig. 1. Positioning the concept of willingness to externalise costs (WTE) within the context of public goods and public bads.

Our second research question is: How does the identity of the suffering party influence WTE? In line with the above, we examine four groups, representing what Becker [35] calls the main sustainability relations: (i) the ethical relationship among generations (intergenerational equity; LATER) (ii) the ethical relationship between humankind and nature (environmental ethics; OTHER), and (iii) global ethical relations (intragenerational equity; HERE and FARTHER).

3. Material and research design

Material. Our survey was conducted among Hungarian students attending a BA programme in Business and Management over a period of 7 years (2015–2022; seven waves with two sub-waves each, in the fall and spring semester), with the same methodology (via the school's e-learning system). Respondents were students of Corvinus University of Budapest (Hungary's leading university in the field of economics and business), future decision-makers in the Hungarian and international business life.

At the time of the survey, 99% of the respondents were aged between 18 and 24 years (70% were aged 18–19 years, entering the university upon graduating from secondary school), and 91% of the total seven-year sample were born between 1995 and 2002. Participation in the survey was voluntary, with a response rate of 69.4%. The questionnaire was always taken at the very beginning of the semester, in the first week, to ensure that the discussion of sustainability issues within the course does not influence the responses. The sample size is large (N = 3669) due to responses being collected in multiple waves. Responses with missing values were excluded from the respective analyses, which is why the N values reported in Tables 3, 4 and 6 are slightly lower than the total sample size. 59.8% of respondents were female and 40.2% were male. The high number of respondents makes it possible to obtain reliable results regarding the willingness to externalise (WTE) as a construct, and its relationship with gender. However, due to the lack of representativity, the results cannot be generalised to wider groups.

Research design. We created a hypothetical situation[1] that emulates the phenomenon of public bads, i.e. individually small damages affecting many (endured involuntarily by the sufferers) on one side, while on the other side, as a kind of summation of these (assuming a zero-sum game) the respondent has the opportunity to reap a large benefit. Respondents' willingness to externalise was measured through their acceptance or rejection of this opportunity. The situation requires an active choice on the part of the respondent, i.e. to reveal the extent to which she/he is willing to benefit by knowingly imposing a specific, quantified cost[2] on others. We constructed a WTE statement for each of the four domains/relations discussed in Section 2.2 (which we label as HERE, LATER, FARTHER, OTHER) and complemented these with a fifth (labelled VOL), which enquires about respondents' willingness to accept small sums of money from many others if these are offered as voluntary donations. This additional statement (VOL) represents an ethically less problematic

[1] Using hypothetical payments to study WTE is similar to how contingent valuation (and specifically willingness to accept) is used to study monetary values ascribed to environmental change – however, there are some key differences: (i) Unlike contingent valuation, there is no specific environmental change being evaluated in our scenario – rather, the decision is about causing harm to others for personal gain. (ii) In case of willingness to accept, the decision is about accepting compensation for a change caused by others that is unfavourable to the respondent – in our concept of WTE, the harm itself is initiated by the respondent and falls purely on others.

[2] Expressing the effects in monetary terms places our research within the weak sustainability paradigm, however, opening up the study to include relations with non-human beings represents a step in the direction of the strong sustainability interpretation ([55]; [56]: 1474–1475). Measuring WTE for non-human beings poses a methodological challenge because in this case, speaking of monetary damage would not make sense, therefore, in this case, the WTE statement simply mentions welfare loss (see Table 1).

situation and serves as a reference to the other, more morally charged cases, where the loss to others is imposed against their will. In all cases, attitudes towards the statements were measured on a 7-point Likert scale, with –3 indicating total disagreement (rejection of externalisation) and +3 indicating total agreement (acceptance of externalisation). Table 1 presents a summary of the relations studied and the statements used to measure them.[3] It also presents expectations regarding the differences in the willingness to externalise across these relations based on the related literature.

As our research studies a new concept using new methods, the selection of the precise parameters (the amounts of money and the physical and temporal distances used in the WTE statements) is experimental. Rather than opting for a single, arbitrarily selected set of parameters during the entire research, the financial stakes and distances in the WTE statements were varied across the different data collection waves (see Table 1, 4 and 5), all while maintaining the fundamental setup of a large personal gain versus individually small losses. This was done to increase the robustness of the results regarding our research questions pertaining to the overall acceptance of WTE and to the influence of the identity of the suffering party. The influence of the data collection wave and the statement parameters on WTE was nevertheless tested in a regression analysis (see Section 4.2).

In order to facilitate future replication of our results and conducting comparable studies, we suggest that studies aimed at measuring WTE should have the following characteristics: (1) The WTE scenario – and the entire questionnaire it is a part of – should avoid any reference to sustainability/environmental issues/externalities. The statements should be worded in a neutral way. (2) The WTE scenario should be purely abstract and not tied to any specific issue (such as climate change, animal rights, etc.) to avoid respondents' opinions on these issues distorting the answers. (3) The WTE scenario should be a zero-sum game, with the potential gain for the decision maker (a large sum) being the same as the sum of the losses, which should be small individually and be spread among a large number of potential suffering parties. (4) The sums involved should be round amounts that are easy to interpret and contextualise for the respondents (e.g. the population of the country/region rounded to powers of 10).

4. Results

4.1. Individuals' willingness to externalise costs (WTE) by relations and gender

In all data collection waves, respondents' average willingness to externalise was found to be slightly positive across the entire sample. (For a summary of the descriptive survey data see Table 2.) On a Likert scale ranging from [–3, +3], the average WTE score was 0.33. Comparing willingness to externalise across the various relations, we found the highest acceptance for voluntary donations (VOL, 1.23) (Table 2). This is unsurprising as this scenario is ethically the least problematic (although it still involves generating costs for others), and as such it serves as a benchmark to assess the other, more ethically charged relations. For the latter, acceptance is significantly lower, but still leans toward acceptance for shifting the costs to future generations (LATER, 0.32) and non-human beings (OTHER, 0.15) (Table 2). The lowest average acceptance in the sample – still a neutral, "maybe accept/maybe reject" position and not a strong rejection – was for members of the current generation living close to the respondent ("all Hungarians"; HERE) as well as those far away ("outside Europe" or "on the other side of the world"; FARTHER) (both –0.02; Table 2).

[3] The use of an unspecified, hypothetical app was chosen as the vehicle for the decision as our sample consists of young people who are accustomed to using apps for many purposes in their everyday life. We did not want to influence our respondents with regard to how specifically the app in question should be imagined.

Table 1
Measurement of the willingness to externalise (WTE) and summary of the expectations.

WTE relation	Statement (all were measured on a 7-point Likert-scale)	Expectation	Basis in the literature
Voluntary donations (VOL)	I would accept it if every person in Hungary willingly gave me [0.1 – 1 – 10 – 100] HUF, and I would thereby gain [1 – 10 – 100 – 1000] million HUF.	Acceptance assumed to be higher if the money is voluntarily given than for all other scenarios (where the loss is inflicted without consent).	Saunders [37]
People from the same country (HERE)	I would use an app if it meant that all Hungarians would suffer a minimal welfare loss of [0.1 – 1 – 10 – 100] HUF, and I would thereby gain [1 – 10 – 100 – 1000] million HUF now.	Acceptance assumed to be lower than for all other scenarios (respondents are less willing to cause harm to people who are closer to them in space and time).	Becker [35] Bithas [29] Busemeyer [38] Fiedler et al. [39] Wade-Benzoni and Tost [28]
People far away (FARTHER)	I would use an app if it meant that ten million people [outside Europe – on the other side of the world] would suffer a minimal welfare loss of [0.1 – 1 – 10 – 100] HUF, and I would thereby gain [1 – 10 – 100 – 1000] million HUF now.	Acceptance assumed to be higher than for people from the same country (respondents are more willing to cause harm to people who are more physically and culturally distant).	Becker [35] Bithas [29] Fiedler et al. [39]
People in the future (LATER)	I would use an app if it meant that in [10 years' – 50 years'] time, ten million people would suffer a minimal welfare loss of [0.1 – 1 – 10 – 100] HUF, and I would thereby gain [1 – 10 – 100 – 1000] million HUF now.	Acceptance assumed to be higher than for people in the present (respondents are more willing to cause harm to members of future generations).	Becker [35] Bithas [29] Busemeyer [38] Wade-Benzoni and Tost [28]
Animals (OTHER)	I would use an app if it meant that a few [100 – 1000 – 10,000 – 100,000] hens would suffer some welfare loss and I would thereby gain [1 – 10 – 100 – 1000] million HUF now.	Acceptance assumed to be higher than for all other dimensions, except voluntary donations (respondents are more willing to cause harm to non-human beings than to humans).	Becker [35] Johansson-Stenman [40] Lusk and Norwood [41]

Notes: WTE-statements are scalable by place, time (coded by the variable DISTANCE, see Table 5) and amount of the hypothetical bargain (coded by the variable STAKElog, see Table 5). Hungary has approx. 10 million inhabitants. HUF is for Hungarian Forints. 364 HUF = 1 EUR; 314 HUF = 1 USD as of 11/09/2026.

We found that women were clearly less willing to externalise costs for their own benefit than men in all relations: the average WTE score for all statements together was –0.09 for women and 0.97 for men (Table 2).

Table 2
Average scores and variances of willingness to externalise (WTE) by relations and gender.

Variable	Scale	Mean	Variance
VOL female	[–3, +3]	0.95	4.12
HERE female	[–3, +3]	−0.43	3.98
FARTHER female	[–3, +3]	−0.45	3.85
LATER female	[–3, +3]	−0.11	4.10
OTHER female	[–3, +3]	−0.43	4.04
average WTE female	[–3, +3]	−0.09	-
WTE SCALE female	**[–15, +15]**	**−0.41**	**68.20**
VOL male	[–3, +3]	1.65	3.46
HERE male	[–3, +3]	0.61	4.47
FARTHER male	[–3, +3]	0.63	4.46
LATER male	[–3, +3]	0.96	4.21
OTHER male	[–3, +3]	1.02	3.86
average WTE male	[–3, +3]	0.97	-
WTE SCALE male	**[–15, +15]**	**4.94**	**73.17**
VOL	[–3, +3]	1.23	3.97
HERE	[–3, +3]	−0.02	4.43
FARTHER	[–3, +3]	−0.02	4.37
LATER	[–3, +3]	0.32	4.41
OTHER	[–3, +3]	0.15	4.47
average WTE	[–3, +3]	0.33	-
WTE SCALE	**[–15, +15]**	**1.74**	**77.07**

Note: For an explanation of WTE SCALE see Section 4.2.

For women, the only statement with a positive average score was the voluntary donations (VOL female, 0.95 – still substantially lower than VOL male, 1.65) while the men's average was positive for all statements.

A more in-depth view of WTE can be gained by looking not only at the sample averages but also at the distribution of responses. For the purposes of the analysis, the 7-point Likert scale was reduced to three categories: clear rejection (–3: "definitely not" and –2: "probably not" on the Likert scale), uncertainty (–1: "perhaps not"; 0: "maybe yes maybe no"; and +1: "perhaps yes") and clear acceptance (+2: "probably yes" and +3: "definitely yes"). According to this three-way breakdown, 39.17% of the overall sample agree to externalise, while around a third (34.25%) are uncertain about externalisation and a quarter of the respondents (26.59%) reject it (these are the average proportions across the five relations see Table 3).

Using the three categories, we examined the structure of responses by gender and by relation. Rather than presenting 12 individual distribution functions, we use the IntenScope method presented by Kocsis [42]. This method can be used to visualise various ratios of three quantities in two dimensions. The three quantities in this case were the frequencies of the three categories described above (clear rejection, uncertainty, clear acceptance) in the sample – their proportions were plotted in Fig. 2. The interpretation of the figure is aided by pictograms representing the distribution of responses according to the three categories. The centre of the figure represents a hypothetical equal distribution, with rejection ("–"; blue columns), uncertainty ("0"; grey columns) and acceptance ("+"; red columns) all having a 33.3% share of responses. From this central point, six IntenScope axes point in six directions, along which the proportions indicated on the axes change. For example, moving from the centre to the right, the acceptance(+)/rejection(–) ratio increases; moving downward and to the right, the acceptance(+)/uncertainty(0) ratio increases; and so on – the specific ratios can be inferred from the values indicated on the axes (twofold, fourfold, etc.; axes are logarithmic). The axes emanating from the centre also divide the 2D surface into six parts, and the distributions characteristic for each plane sixth are also shown as pictograms.[4]

The IntenScope plane presented in Fig. 2 permits a nuanced comparison of WTE results, showing all distributions by gender and relations in a single figure. It shows that, except for the acceptance of the ethically less loaded voluntary donation (VOL female), women lean more toward rejection while acceptance is the dominant attitude for men. Regarding the specific relations, we can find balanced distributions leaning only slightly towards rejection (such as LATER female, and women's responses as a whole: SUM WTE female – the points representing these are located near the centre of the figure); as well as distributions with a roughly equal weight of rejectors and undecideds with a small proportion of offer-acceptance (FARTHER female, HERE female and OTHER female). These latter distributions are remarkably similar, the points representing the distributions are located close together in the figure (Fig. 2– see Table 3 for specific numerical values). In contrast, men's generally accepting attitudes towards externalisation are well represented on the right side of the figure. Compared to the extremely high acceptance of voluntary offers (VOL male), there is a decline for the ethically charged non-voluntary relations, which is mainly due to the growth of the undecided group at the expense of clear acceptors (though the former never become dominant).

Comparing responses according to the different relations (suffering parties), it can be seen that a higher share of women as well as men are willing to create external costs for people in the future than in the present, while the difference regarding people from the same country and people on the other side of the world/outside Europe is very small for both genders (LATER female vs. HERE female and FARTHER female; LATER male vs. HERE male and FARTHER male). Regarding non-human beings (OTHER) however, men have a far higher WTE relative to other dimensions than women – for men, this is the most accepted dimension of cost externalising (with the exception of voluntary donations; VOL male), while women are less willing to reduce the welfare of animals (OTHER female) than of future humans (LATER female).

4.2. Results using willingness to externalise statements as a unified scale (WTE SCALE)

By adding the Likert scales for all five statements, each with a 7-point range [–3, +3], we obtained a unified scale with a 31-point range [–15, +15] (WTE SCALE). The internal consistency of the WTE SCALE generated from the five components (VOL, HERE, LATER, FARTHER, OTHER) is very high, the Cronbach's alpha value is 0.898. The descriptive statistics for WTE SCALE can be seen in Table 2, data by survey waves are in Table 4.[5]

[4] For example, the upper right sixth of the plane contains distributions characterised by a high share of undecided (0) and accepting answers (+) compared to rejections (–), while in the lower right plane sixth, only the share of acceptors (+) is high and the share of undecided (0) and rejectors (–) is lower than 1/3.

[5] While the scenario involving voluntary donations (VOL) is a useful element to capture the full range of attitudes toward the possibility of gaining an „unearned" sum of money that others pay for, it does not entirely fit into the concept of „cost externalisation" in the sense that the loss is not involuntarily imposed. For this reason we have also created an alternative version of the aggregate WTE SCALE that does not include the VOL component, only the other four relations (HERE, LATER, FARTHER, OTHER). In this case we obtain a unified scale with a range of [−12; +12] (the sample average on this 4-element WTE-scale is 0.45, the variance is 55.77). The Cronbach's alpha of this 4-element WTE SCALE is 0.909, which is very close to the Cronbach's alpha for the 5-element scale. The fact that the inclusion of the VOL component does not meaningfully reduce the internal consistency of the WTE SCALE indicates that it measures the same underlying construct and therefore has a place in the unified scale. Therefore, we continue the presentation of the results using the 5-element scale (with VOL), while reporting the results with the 4-element scale (without VOL) in footnote 7 and 9.

Table 3
Count and share of Likert scale responses to WTE-statements by relations and gender.

	Count				Share			
	- [-3,-2]	0 [-1,+1]	+ [+2,+3]	SUM	- [-3,-2]	0 [-1,+1]	+ [+2,+3]	SUM
VOL female	412	583	1 166	2 161	19.07%	26.98%	53.96%	100%
HERE female	809	877	481	2 167	37.33%	40.47%	22.20%	100%
FARTHER fem	795	899	474	2 168	36.67%	41.47%	21.86%	100%
LATER female	690	846	623	2 159	31.96%	39.18%	28.86%	100%
OTHER female	783	856	499	2 138	36.62%	40.04%	23.34%	100%
SUM WTE female	**3 489**	**4 061**	**3 243**	**10 793**	**32.33%**	**37.63%**	**30.05%**	**100%**
VOL male	162	268	1 006	1 436	11.28%	18.66%	70.06%	100%
HERE male	325	466	643	1 434	22.66%	32.50%	44.84%	100%
FARTHER male	319	470	645	1 434	22.25%	32.78%	44.98%	100%
LATER male	256	419	757	1 432	17.88%	29.26%	52.86%	100%
OTHER male	220	461	734	1 415	15.55%	32.58%	51.87%	100%
SUM WTE male	**1 282**	**2 084**	**3 785**	**7 151**	**17.93%**	**29.14%**	**52.93%**	**100%**
VOL	574	851	2 172	3 597	15.96%	23.66%	60.38%	100%
HERE	1 134	1 343	1 124	3 601	31.49%	37.30%	31.21%	100%
FARTHER	1 114	1 369	1 119	3 602	30.93%	38.01%	31.07%	100%
LATER	946	1 265	1 380	3 591	26.34%	35.23%	38.43%	100%
OTHER	1 003	1 317	1 233	3 553	28.23%	37.07%	34.70%	100%
SUM WTE	**4 771**	**6 145**	**7 028**	**17 944**	**26.59%**	**34.25%**	**39.17%**	**100%**

Note: SUM WTE shows the sums /count/ and averages /share/ of the individual WTE statements.

Using this unified WTE SCALE as the dependent variable, we created a regression model to test the simultaneous effects of gender and data collection wave on the willingness to externalise costs. As the data collection took place over seven years, WTE SCALE may have changed over this period as a result of a shift in attitudes or in external circumstances (such as economic conditions). In addition to the passage of time, the different data collection waves also differed in the exact wording of the WTE statements, using varied financial stakes and varied degrees of physical and temporal distance from the suffering parties (see Table 1).

The equation for the regression model is as follows:

$$\text{WTE SCALE}_i = \beta_0 + \beta_1 \text{FEMALE}_i + \beta_2 \text{WAVE}_i + \beta_3 \text{STAKElog}_i + \beta_4 \text{DISTANCE}_i + \varepsilon_i$$

where WTE SCALE is the score on the unified WTE scale [–15, +15]; FEMALE refers to the gender of the respondent; WAVE indicates the data collection wave; STAKElog shows the financial stakes (gains and losses) used in the WTE statements; and DISTANCE refers both to the spatial distance (in the FARTHER statement) and the temporal distance (in the LATER statement) used in the WTE statements (see Table 5 for how each variable was coded).

The model explains 9.3% of the variance of WTE SCALE, which, while clearly significant ($p < 0.001$), is moderate, indicating that further factors not included in the model may also have an important influence on individuals' WTE SCALE. This was to be expected since it was not the aim of our study to uncover all potential determinants of WTE – the regression model is intended to provide a picture of the role of the factors that can be assessed based on this initial survey, and to support the calibration of the WTE statements regarding the stakes and distances used.

The results for the individual independent variables can be seen in Table 5. The significantly lower WTE of women is confirmed – controlling for the other variables, they score on average 5.323 points lower on the unified [–15;+15] WTE SCALE than men. This means that for each of the 5 WTE statements, on average, the women's answers on the 7-point [–3;+3] Likert scale were leaning more toward rejection by a little over 1 point. Somewhat surprisingly, the magnitude of the potential gain (and resulting loss for the suffering parties) (STAKElog) did not have a significant effect in the ranges we studied. The effect of the data collection year (WAVE), while statistically significant in our large sample, is very small, indicating that WTE values did not meaningfully change during the observed time period. The same is true for the DISTANCE variable: the direction of the statistical relationship is interesting (WTE is lower if the distance in space and time from the decision maker is greater) but the effect size is so small that the practical relevance of this result is questionable.[6,7]

As the model shows gender to be an important factor influencing WTE, we further analyse the distribution of WTE separately for men and

[6] Because the stakes and distances used in the WTE statements varied across (rather than within) survey waves, it is important to rule out the possibility of multicollinearity between the independent variables distorting our results. For gender (FEMALE) and financial stakes (STAKElog) the low VIF scores (see Table 5) indicate that this is not an issue, however, for the time period (WAVE) and the physical and temporal distance (DISTANCE) the VIF scores are somewhat higher (while still remaining in the acceptable range). It might therefore be the case that the low effect size of these variables results from their effects cancelling each other out (e.g. WTE increasing with the passage of time but reducing with the smaller distance in the FARTHER and LATER component) – to rule out this possibility we conducted separate regressions omitting WAVE or DISTANCE and found that the other still had no effect, confirming the above conclusion that these had no meaningful influence on WTE.

[7] We also performed the regression analysis for the alternative WTE SCALE with 4 components (without VOL). This yielded very similar results regarding the overall explanatory power of the model and the parameters for the individual independent variables.

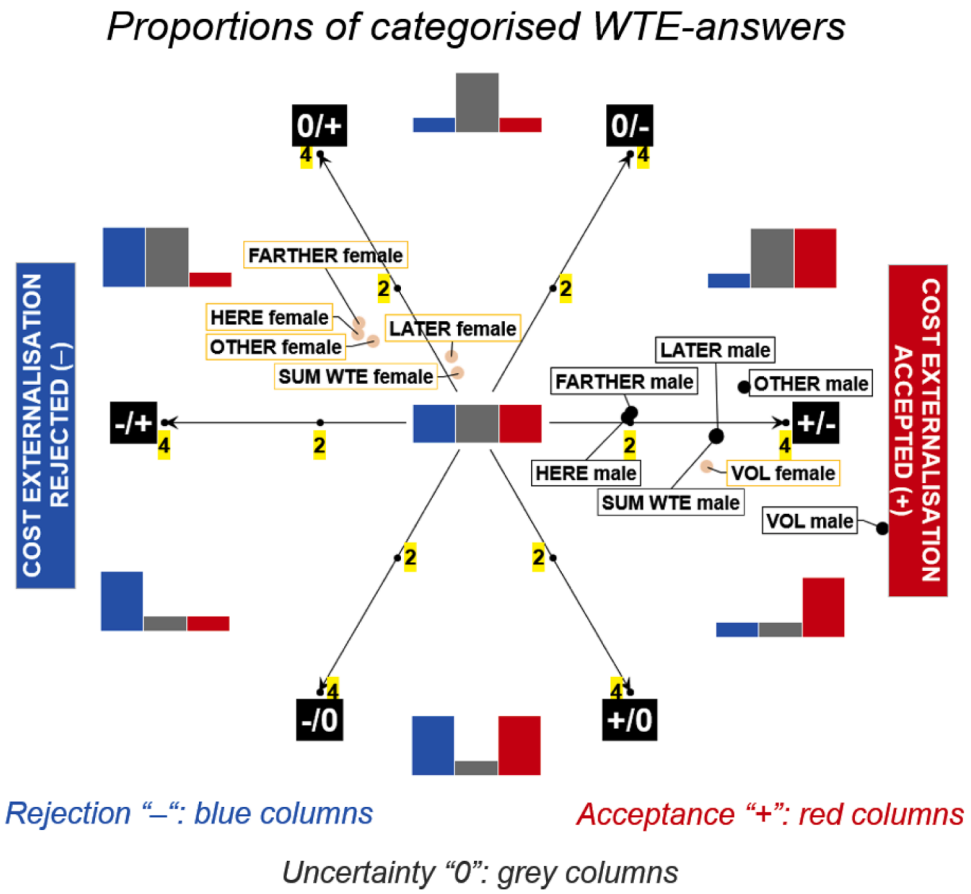


Fig. 2. Intenscoping distributions of Likert-scale responses to willingness to externalise (WTE) statements by relations and gender. Detailed data are in Table 3.

women. For this purpose, the very wide range of the WTE SCALE was reduced to five categories, [–2, +2] (reduced unified WTE SCALE).[8]

As shown in Fig. 3, the distribution of women's willingness to externalise is virtually symmetric (skewness: 0.031) and somewhat platykurtic compared to the normal distribution (kurtosis: –1.015); women's mean on this scale points very slightly towards a rejection of externalisation: –0.059 (Table 6). The men's distribution resembles an exponential curve and has a negative skew (skewness: –0.695); men's mean on this [–2, +2] scale indicates a clear willingness to externalise: 0.732 (Table 6).[9]

5. Discussion

In light of the results (Fig. 3), we can state that approximately 1/3 of women and over 60% of men in our sample show a willingness to externalise costs (+1 or +2 on the reduced unified WTE SCALE) (research question 1). While the concept of WTE is new, a range of phenomena that are known to influence human behaviour in other contexts are also observable here – including various forms of social discounting, moral disengagement, speciesism as well as gender differences. The examination of WTE by relations (research question 2) partially confirmed expectations based on the literature (see Table 1): the level of acceptance was highest for the voluntary donations, and we also found a higher willingness to externalise toward individuals in the future than in the present. However, there was no difference between the willingness to externalise across space (people from the same country vs. people far away). Also somewhat contrary to expectations is the fact that average WTE in relation to animals – while higher than for humans in the present – was lower than for humans in the future. Overall, the differences in average WTE between the different relations were smaller than the differences between average WTE for men and women – the identity of the suffering party appears to matter less for the decision to externalise than the characteristics of the decision maker, particularly their gender (see Fig. 2). These results appear robust within the range of monetary sums and temporal and physical distances we tested (which themselves have no meaningful effect on WTE). This indicates that within the fundamental setup of a huge personal gain versus individually small losses affecting others, the exact parameters have little influence on the WTE decision – the personal attitude to the generation of known externalities appears to matter more than their size or exactly how far in space and time the suffering parties are removed from the decision maker.

Although there is no prior research that is suitable for direct comparison with our results, the pronounced differences that we found in WTE between women and men are not entirely surprising given previous insights from the literature. In experimental economics, studies found

[8] Respondents with a score of –2 on the reduced unified WTE SCALE can be considered as strongly rejecting cost externalisation, while those with a score of –1 also reject it to a less pronounced degree. Respondents scoring +2 on the scale are strongly willing to externalise, while those scoring +1 are also willing to externalise to some extent. Those whose score was categorised as 0 are neutral/undecided.

[9] We also examined the alternative, 4-element WTE SCALE (without VOL) – also reduced in a proportionate and symmetrical manner to a range of [–2; +2]. We obtained a distribution of responses for men that is very similar to the one seen in Fig. 3: exponentially shaped and concentrated toward acceptance (negatively skewed; Skewness –0.6, Kurtosis –0.94). For women, however, the distribution shifts from a platykurtic normal distribution to one that is more exponentially shaped and slightly concentrated towards rejection (positively skewed; Skewness 0.178, Kurtosis –1.215). This is because among women (as can be seen Fig. 2), there is a greater difference in the acceptance of the VOL scenario vs. all the other scenarios than among men.

Table 4
Average scores of willingness to externalise (WTE SCALE) by survey waves.

		Statements wording		MALE		FEMALE		ALL (raw)		ALL (assuming equal gender proportions)	
WAVE	Semesters	STAKElog	DISTANCE	N	WTE SCALE [-15;+15]	N	WTE SCALE [-15;+15]	N	WTE SCALE [-15;+15]	% female	WTE SCALE [-15;+15]
1	2015/16	1	1	230	5.44	322	0.67	552	2.66	58.3%	3.06
2	2016/17	3	1	163	4.94	248	0.11	411	2.03	60.3%	2.53
3	2017/18	2	1	156	5.15	294	-1.03	450	1.11	65.3%	2.06
4	2018/19	0	1	182	3.71	315	-2.03	497	0.07	63.4%	0.84
5	2019/20	2	0	213	4.72	296	-0.57	509	1.64	58.2%	2.08
6	2020/21	2	0	197	4.96	295	-0.23	492	1.85	60.0%	2.36
7	2021/22	2	0	256	5.40	311	0.24	567	2.57	54.9%	2.82
Total				1397	4.94	2081	-0.41	3478	1.74	59.8%	2.27

Note: For codes of STAKElog and DISTANCE see Table 5. The last column presents the averages of WTE SCALE by wave assuming equal gender proportions in the sample.

that women exhibit more altruism than men, but also more risk aversion, which may lead to different results depending on the characteristics of the specific scenario studied [9]. In situations where there is no risk involved, such as dictator games, women are more generous than men [43]. In public goods games, most women behave as "conditional cooperators", making their contributions contingent on the contributions of others (or, if these are not known in advance, on their beliefs regarding how much others will contribute), while the share of pure free riders (those who contribute zero, regardless of the contributions of others) is significantly higher among men than women [9].

There is also a large amount of evidence showing that women are more engaged in green consumption/pro-environmental behaviour. A review by Zhao et al. [10] finds that women are "greener" than men in terms of their purchasing intentions as well as their actual purchasing behaviour and carbon footprint. They explain this with the stronger altruism and social orientation found in women, as well as societal expectations for them to behave in a "caring" way. The gap between pro-environmental values and behaviour was measured in a variety of social dilemma experiments by Hoffmann *et al.* [44] who found it to be significantly higher among men than women. In the field of ethics, studies examining the impact of gender have either found no difference or found women to be more ethical than men [11]. However, because ethics surveys most often rely on self-reported questionnaires rather than the observation of actual behaviour, the difference may in part be due to the social desirability response bias (the tendency to answer in socially desirable ways), which women are shown to be more susceptible to [45].

It is therefore plausible that women having a lower WTE than men might be a result of their higher levels of altruism and social orientation as found in the literature (ours is also a completely risk-free scenario for the respondent), but our data does not allow us to test whether this is indeed the case, or to identify other potential mediators between gender and WTE. We also cannot rule out that the social desirability response bias may have shaped our results to some extent (though we tried to minimise this by the questionnaire being self-administered and its text emphasising that respondents should provide their honest opinion instead of what they perceive to be the "right" answers).

Regarding the role of gender in shaping the *relative* willingness to externalise across the different dimensions/relations, the only significant difference we found was that women were more reluctant than men to reduce the welfare of animals relative to other groups (women's WTE for hens was similar to their WTE for humans in the present and lower than for humans in the future; while men had a higher WTE for hens than for any other group, except the voluntary donation scenario). This is in line with the findings of Johansson-Stenman [40] where women attributed a significantly greater weight to animal suffering as compared to human suffering than men.

6. Limitations and further research

Our sample consisted of undergraduate business students, which limits the generalisability of the results to the broader population. The use of (undergraduate) student samples is common practice in experimental economics [46] as well as in studies on ethical behaviour [45]. Studies comparing student and non-student samples have shown that

Table 5
Linear regression coefficients; dependent variable: WTE SCALE [–15;+15].

Variable	Coding	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
(Constant)		6.674	1.088		6.134	0.000		
FEMALE	0=male; 1=female	−5.323	0.290	−0.297	−18.375	0.000	0.998	1.002
WAVE	from 1 = 2015/16 to 7 = 2021/22	−0.353	0.146	−0.083	−2.421	0.016	0.225	4.450
STAKElog	0 = 1million HUF; 1 = 10million HUF; 2 = 100million HUF; 3 = 1billion HUF	0.281	0.185	0.028	1.524	0.128	0.795	1.258
DISTANCE	0 = FARTHER "outside Europe" & LATER: "in 10 years time" 1 = FARTHER "on the other side of the world" & LATER: "in 50 years time"	−1.427	0.633	−0.081	−2.253	0.024	0.203	4.936

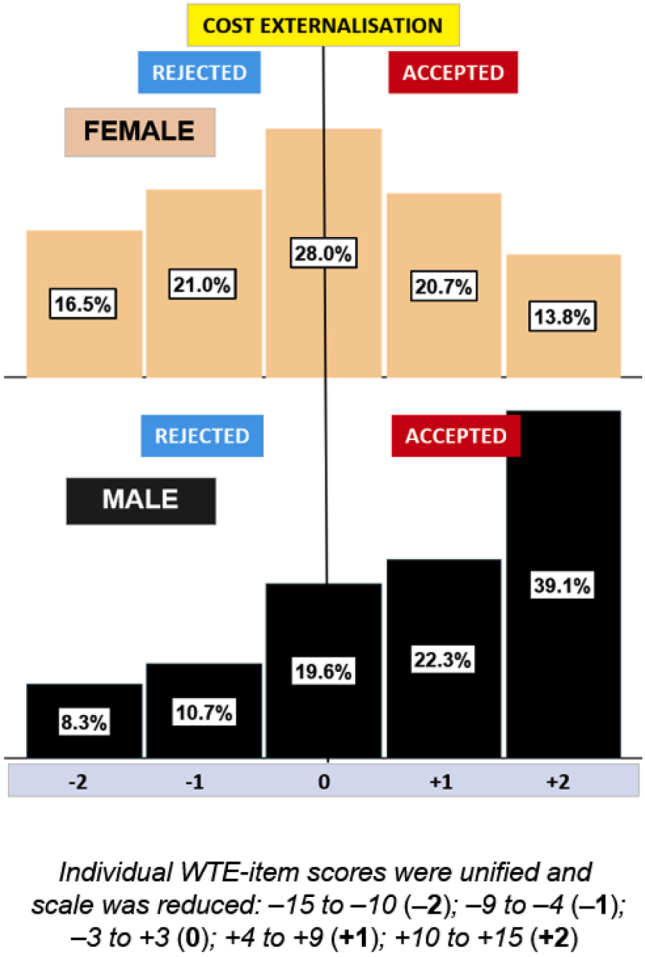


Fig. 3. Distribution of respondents on the reduced unified willingness to externalise scale [–2, +2] by gender.

there can be substantial differences in the point estimates, but the effects of a wide range of influencing factors tend to point in the same direction regardless of the type of the sample [46]. Based on the above, we believe that, while the absolute results regarding WTE might be different in the general population – average WTE would likely be lower, as previous studies have found lower levels of pro-social orientation [47,48] and a higher acceptance for questionable ethical practices [49] among students than adults – we have reason to assume that our results regarding gender and the various dimensions of cost externalising might also hold true across a broader population. It should also be noted that the students in our sample were enrolled in business programmes. We believe that the impact of the university curriculum on the students' thinking at the time of the survey was limited, as it was carried out at the beginning of their studies. Nevertheless, it is possible that students choosing to pursue studies in business might already possess a certain type of mindset that may bias the results. It is encouraging that previous studies have found no significant difference between business students and students of other fields regarding ethical [50,51] or sustainability attitudes [50], but of course we do not know whether this also holds true for WTE. In any case, a crucial next step is to verify the results of our study on representative samples.

A further limitation is the hypothetical nature of the scenario – we cannot be sure that individuals would make the same decision if faced with real gains and costs. Indeed, our scenario, with a large individual reward and a large number of involuntary sufferers would be impossible to replicate with real payments, but we should note that individuals do make real decisions involving the externalisation of costs in their daily life

Table 6
Descriptive statistics of the reduced unified willingness to externalise scale [–2, +2] by gender.

	Female	Male	Total
N	2081	1397	3478
Mean	−0.059	0.732	0.259
Std. Deviation	1.276	1.300	1.343
Variance	1.627	1.690	1.803
Skewness	0.031	−0.695	−0.213
Std. Error of Skewness	0.054	0.065	0.042
Kurtosis	−1.015	−0.666	−1.111
Std. Error of Kurtosis	0.107	0.131	0.083

– the issue is precisely that when making such decisions, people do not think of them as "cost externalisation". Future research might uncover whether assessing WTE in relation to specific scenarios (such as damage to others arising through various types of pollution) rather than the purely abstract situation we have used in our study, produces different results.

Our choice of a hypothetical app as the vehicle for the decision was chosen because of its familiarity for our young respondents – we do recognise, however, that placing the decision in the digital space, in a somewhat "gamified" setting might lower its perceived moral weight [52], thus inflating WTE scores. (However, we should note that in the real world, the consequences of cost externalisation also tend to be far removed from the decision maker, so much so that people are not necessarily even aware of their existence – while in our scenario they are made explicit.)

Caution is warranted when comparing our results regarding animals with the other relations, as in this case, the damage could only be expressed as a general welfare loss rather than the precise monetary amounts used for the other suffering parties – nevertheless, we believe that including the relationship with other species in our framework is a valuable addition that addresses an important dimension of sustainability and cost externalisation. We used hens to represent the OTHER category because the discussion on animal welfare is centred around domestic animals [53] and this is where the impact of consumer decisions is most directly present – but it would also be interesting to examine the OTHER dimension using different, non-domestic species that people are not used to regarding as commodities.

Future research on WTE could also examine the various possible factors associated with individuals' WTE – our study was able to capture the effect of gender, but it is clear that many others may be relevant. This might include other demographic variables, such as age, income or education (including level and field), cultural factors (whether similar patterns emerge in different countries, for example), values, or personality traits. The context of the decision is something that might also matter, particularly if it has to be made publicly, in front of others, as opposed to the confidential, online setting used in our study.

It would be particularly interesting to examine whether there is a connection between the willingness to externalise and pro-environmental behaviour, to see whether individuals who have a low WTE also do more to avoid generating public bads in real life. Similarly, a cross-examination of WTE and support for environmental policies would also be interesting to understand to what extent support for such policies (or lack thereof) can be explained by people's acceptance of cost externalisation, and to what extent it depends on other factors like attitudes toward the specific issue or concerns about policy effectiveness [54].

7. Conclusion

This paper contributes to the literature by making explicit the question whether a shift towards sustainable behaviour contributes to the public good or rather, it eliminates the public bad. We argue that it can also be understood as the latter and develop the concept of the willingness to externalise costs as a tool to directly examine decision

making in relation to public bads. Measuring WTE helps to understand whether individuals are, in principle, willing to cause small losses to many others for personal gain. Thus, it might help to assess whether making people aware of the environmental harms associated with everyday consumption decisions can be expected to result in behaviour change.

We find that, although there is a substantial share of individuals with consistently high WTE in our sample (especially among men), the proportion of those who reject or at least keep a cautious distance from cost externalisation is even greater (61%) (despite the fact that the damage caused to others in our scenario was individually very small). It is also encouraging that our respondents do not appear to devalue the well-being of people physically distant from them compared to those who are closer, but we still found evidence for a discounting of the welfare of future generations. Regarding non-human beings, we found a marked contrast between women and men: while the former appear to consider them on par with humans in the present, men are far less concerned about their well-being.

While testing the relationship between WTE and actual behaviour lies outside of the scope of the current research, it is worthwhile to formulate some hypothetical implications that further research might verify – these are outlined in the following paragraphs.

It is reasonable to assume that in order to promote sustainable behaviour the two groups (those with low and those with high WTE) need to be addressed in a different way. While individuals with a high willingness to externalise may reject sustainable behaviours, we expect those with low or medium WTE scores to be susceptible to strategies based on providing information and reframing the sustainability problem in terms of cost externalising. This would involve highlighting the real source of our present – unsustainable – material comfort, i.e. that this comfort is often associated with a reduction in the well-being of other persons/species across time and space. For individuals sensitive to such issues, this could lead to a change of behaviour, resulting in a reduction in public bads.

However, in today's world, cost externalisation is so common that it is not only seen as natural (we take it for granted to get into our cars or eat cheap, mass-produced animal products every day, etc.) but also very difficult to consistently avoid, leading most of those who reject externalisation in an abstract setting to also engage in it in practice. Individual agency is often severely limited by financial, infrastructural and social barriers, therefore, though communication strategies highlighting and problematising externalisation are necessary, they are likely not sufficient. Policy interventions are needed to offer alternatives and to reduce barriers to green behaviour – otherwise, making externalities explicit might achieve no more than instilling a sense of guilt and activating a range of rationalisation attempts in those who view externalisation as unacceptable in principle.

As for those who exhibit a high willingness to externalise, we would expect environmental messaging focusing on the negative impacts to have little effect (unless the impacts can be shown to affect the decision maker him/herself). Our study shows that (at least among undergraduate business students) there is a sizable group of people who do not appear concerned about passing on their costs to others and therefore, it seems unlikely that strategies aimed at eliminating doubts related to specific issues – such as climate science, the effectiveness of various environmental policies or the trustworthiness of green product claims etc. – could bring about behaviour change. This group is expected to require external incentives.

To conclude, this paper offers a new tool to measure individuals' willingness to externalise costs (WTE), built upon the concept of externalities used in economics and sustainability thinking. In our student sample, WTE shows distinct gender differences. As a quantitative indicator WTE can be highly suitable for identifying clusters as well as for uncovering correlations and causal relationships with other important sustainability phenomena on the level of individuals.

Funding statement

This work was supported by the National Research, Development and Innovation Fund of Hungary (T.K., grant number K-143542).

CRediT authorship contribution statement

Tamás Kocsis: Writing – original draft, Visualization, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Zsuzsanna Szerényi:** Investigation. **Anna Széchy:** Writing – review & editing, Writing – original draft, Investigation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The – anonymised and non-aggregated – dataset analysed for the current study is available at the Harvard Dataverse repository, https://doi.org/10.7910/DVN/ZPASG9. Anonymised and aggregated survey data is available in Table 3. For an interactive IntenScope version of Fig. 2 see https://intenscope.com/0/kocsist/WTE.

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