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Are stakeholders' social representations of nature and landscape compatible with the ecosystem service concept?

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ABSTRACT

Background: Implementing ecosystem services (ES)-based planning and management processes in practice, and mainstreaming the results in decision-making, is limited. Literature suggests this can be explained by a limited overlap between the ES concept and stakeholders' representations of nature.

Aims: We introduce social representations theory as an approach to discuss whether the theoretical ES concept is compatible with stakeholders' social representations of nature.

Methods: Thirty-nine stakeholders actively involved in the use and management of a peri-urban study area in Belgium were interviewed about their representation of nature.

Conclusions: Like the ES concept, stakeholders' representation of nature includes an anthropocentric view, but stakeholders also stress the role and responsibility of humans in sustaining ecosystems and regulating nature (which is a relational value). From the qualitative analysis we conclude that the theoretical ES concept and ES classifications are not sufficiently reflecting stakeholders' representations of nature, mainly on the human-nature relationship. The social representations technique provides handles to design ES-based processes according to stakeholders' representations. This can result in more effective ES-based planning and management processes and improved understanding among stakeholders and between stakeholders and process managers.

1. Introduction

The ecosystem services (ES) concept has been developed to strengthen the position of biodiversity and ecosystems in policy, development decisions and land-use planning (Costanza et al., 2017; van den Belt and Stevens, 2016). Despite its history of almost 40 years, this concept is still dealing with uncertainties in the knowledge base, conceptual fuzziness, social controversies and disentangled causal relationships (Barnaud and Antona, 2014; Costanza et al., 2017; Czúcz et al., 2018). The ES concept has been defined as a "boundary object" (Abson et al., 2014; van den Belt and Stevens, 2016): robust enough to bind (opposing) views and values within a communication, scientific or work process, while remaining adaptable or vague enough for participants to maintain their identities across themes, contexts, and networks. Although participative approaches to ES research and ES practice are increasing (Jacobs et al., 2016; Kenter, 2016a; Scholte et al., 2015), the convergence between stakeholders' notions of nature and the theoretical ES concept remains rather unquestioned (e.g. Beery et al., 2016; Willcock et al., 2016; counterexamples include Flint et al., 2013; Raymond et al., 2014; Hansen et al., 2015).

We situate this manuscript in the context of recent insights on the role of relational (Arias-Arévalo et al., 2018; Chan et al., 2016; Díaz et al., 2015; Muraca, 2011), and shared values of ecosystems (Irvine et al., 2016; Kenter, 2016b; Kenter et al., 2015), and the role of these values in ES assessments and other ES-based processes. Kenter et al. (2015) define shared values as the values people hold in common and which are formed through a process of socialisation and through shared social and deliberative processes. Relational values have been introduced in the ES debate as a third class of values, beyond intrinsic and instrumental values (Arias-Arévalo et al., 2018; Berbés-Blázquez et al., 2016; Chan et al., 2016; Díaz et al., 2015). Relational values can be individual or collective, and are embedded in desirable (sought after)

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relationships, rather than in things or beings. Relationships include those among people and between people and nature (Chan et al., 2016). We propose that the recognition of relational and shared values helps to bring to light important aspects of people's representation of nature that may otherwise remain hidden or ignored in conventional ES assessments.

Considering the above, this manuscript aims to contribute to research priority one for integrated ES valuation as formulated by Jacobs et al. (2016), which is dealing with achieving effective stakeholder inclusion in ES research, not only for knowledge co-production and increasing societal relevance of the results, but also with the aim of including hidden values. For this purpose, we use social representation theory as an approach that moves beyond reductionist distinctions (such as between instrumental and intrinsic values), to consider broader notions of value, which may also include relational and shared values related to nature. Social representation theory stems from social psychology and aims to explain how different social groups may develop different understandings of an issue based on their particular values, ideas, knowledge, metaphors, beliefs, and practices (Buijs et al., 2008; Moscovici, 2000). Social representations are not mere individual cognitive representations, but are socially constructed through social interaction within groups and shared among members of groups and communities. Social representations of nature influence communications about assessments of nature and actions towards nature (Buijs et al., 2011; Quétier et al., 2010), especially when used strategically (Blicharska and Van Herzele, 2015).

In a previous article we inductively analysed individual interviews to describe the palette of images of nature present in a peri-urban case study in central Belgium (De Vreese et al., 2016a). Images of nature are individual pronunciations of a shared social reality within groups (Anderson et al., 2013; Moscovici, 2000). In the present article, we focus on these social realities, by examining the social representations of nature of different stakeholder groups. Having insight in these social realities facilitates designing research processes and ES-based decision-making processes that have a societal impact (Folkersen, 2018; Jacobs et al., 2016).

This article is innovative in its focus on the convergence between stakeholders' representations of nature and landscape and the theoretical ES concept that represents nature in terms of ecosystems providing services to people (Millennium Ecosystem Assessment, 2005). This focus is underpinned by research suggesting that a lacking overlap between the ES concept and stakeholders' representations of nature is potentially one of the reasons for the low uptake of ES-based processes in decision-making, planning and management in practice (Hauck et al., 2013; Laurans et al., 2013; Mascarenhas et al., 2014; Primmer and Furman, 2012).

The question addressed in this paper is whether the social representation of nature embedded in the theoretical ES concept converges with empirically derived social representations of nature by different stakeholders. This question is fundamental for bridging the often-mentioned science-practice gap, for example through involving stakeholders within ES research, ES assessments and ES-based management and planning (see also Barnaud et al., 2018). When there is no convergence between the ES concept and stakeholders' representations of nature, stakeholders probably will not be interested to be involved in ES-based processes (Asah et al., 2014; Folkersen, 2018). And, if they are involved in such processes, conflicts may arise out of mutual incomprehension between stakeholders, experts, and/or planning staff. Furthermore, stakeholders may question the relevance, credibility and legitimacy of the results of the ES assessment or ES-based planning and management proposals (Jacobs et al., 2016). Based on our study, we discuss how the social representation approach may assist in operationalising participatory ES-based research.

2. Methods

2.1. Selection of study area and respondents

The case is situated in four contiguous municipalities in central Belgium (Bierbeek, Oud-Heverlee, Beauvechain & Grez-Doiceau) with a peri-urban to rural character (21% built-up area, 39.000 inhabitants, 164 km^2, see Fig. 1 for a map situating the study area and the land use in the study area). The area was selected for its high agricultural, ecological and landscape quality, comprising narrowly interwoven but varied land uses (farmland, woods, treelines, wetland etc.), which is impacted by ongoing urbanisation (see Fontaine et al., 2013; De Vreese et al., 2016b for a more detailed description of the case study area). The population is rather highly educated and prosperous (Statistics Belgium, 2015).

For the study, we interviewed stakeholders actively involved in land use and land management (total N = 39). The respondents were selected from different stakeholder groups: active members of environmental NGOs (eNGOs, managers of nature reserves or board members, N = 7), farmers (N = 4), executive politicians (mayors and aldermen competent for nature, environment, agriculture and/or spatial planning, N = 7), civil servants (similar competences, at municipal and regional level, N = 9), and 12 citizens from various backgrounds (socio-cultural work, culture, arts, sports, recreation). Table 1 gives an overview of the socio-economic characteristics of the respondents and the study area in general.

2.2. Data collection and analysis

Inspired by Bryan et al. (2010), Cast et al. (2008), and Raymond et al. (2009) semi-structured interviews were conducted using open-ended questioning: respondents were asked (1) what nature means to them, (2) what they value in their living environment, and (3) what role they themselves take regarding nature and landscape in their municipality. Before and during these interviews we did not use the term ecosystem services, neither referred to the concept.

Implementing a grounded theory (Strauss and Corbin, 1998)-inspired approach, verbatim-transcribed interviews of the open ended questioning were inductively coded and the emerging codes were thematically grouped along two central dimensions describing the images of nature valid in the study area (De Vreese et al., 2016a for further details). In a next step, to be able to compare the emerging codes with the ES concept, codes were associated (if applicable) with the corresponding ES categories, as listed in Table 4. The list of ES stems from an adapted Millennium Ecosystem Assessment (MEA) ES classification (Millennium Ecosystem Assessment, 2005). We did not include the intermediate supporting ES (e.g. soil formation). In line with Bryan et al. (2010) and Raymond et al. (2009) employment in agriculture, nature & landscape, and recreation were included as provisioning ES. Social representations of nature and landscape across different stakeholder groups were identified using a directed content analysis (Curtis et al., 2001; Hsieh and Shannon, 2005). This technique maps the number of respondents per stakeholder group across different elements in the social representations, and the number of respondents per stakeholder group whose representation refer to individual ES and ES categories across different elements of the social representations.

3. Results

The social representations of nature stemming from the open questions are classified along two dimensions. The first dimension differentiates "nature" versus "culture"; the second dimension differentiates the relationship between humans and nature (including two relations: Re-

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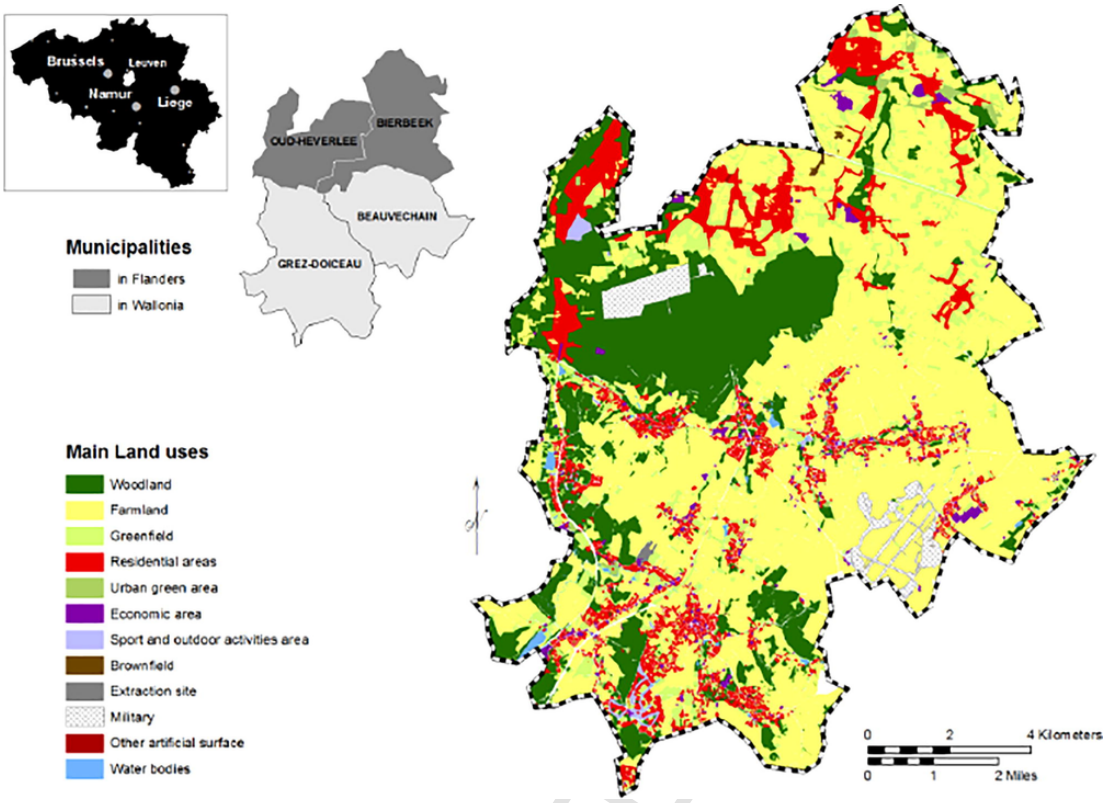

Fig. 1. Situating the study area, and main land use in the study area (Fontaine et al., 2013).

Table 1
Overview of respondents according to background, compared to the demographic data for the study area (Statistics Belgium, 2015).

	Age group						Education		Total
	25–44		45–64		65–84		Secondary	Higher	
Background of respondent	Male	Fem.	Male	Fem.	Male	Fem.			
Politician (mayor/alderman)		1	1	3	2		1	6	7
Civil servant	3	3		3			0	9	9
Environmental NGO	1		4	1	1		0	7	7
Farmer			3	1			2	2	4
Citizen	1		6	1	4		1	11	12
Total # interviewees	5	4	14	9	7	0	4	35	39
Study area (%)	11,2 %	11,3 %	14,0 %	14,0 %	7,3 %	8,1 %	63,1 %	36,9 %	

lation 1. Nature & Landscape for People, versus Relation 2 People for Nature & Landscape). A more detailed discussion of the dimensions, including respondent quotes, is provided in De Vreese et al. (2016a). To increase readability, we do not mention the numbers of respondents adhering to specific elements in the description below; readers can consult Table 3.

3.1. Dimension 1: Nature versus Culture

Some respondents prefer nature not influenced by men or attribute a higher aesthetical quality to "untouched" nature. This representation could be labelled Primeval Nature. From the answers it becomes clear that Primeval Nature is more an aspiration than a reality, as respondents agree there is no "real nature" left in the area.

A "cultured" representation of nature refers to the ecological, recreational and aesthetical quality of the local landscape in which humans have intervened. All stakeholders appreciate this Cultured Nature aspect and urge to conserve and strengthen it, including the role of agriculture as manager of the landscape.

More people referred to Cultured Nature (15) than to Primeval Nature (3), yet 16 respondents make references to both (further termed "combined relation"). Five respondents are undetermined. Members of environmental NGOs (eNGOs) and politicians refer most to Cultured Nature (including the combined relation). Civil servants adhere more to Primeval Nature than other groups (including the combined relation), farmers refer the least to Primeval Nature.

When we situate the Nature vs. Culture dimension within the adapted MEA classification (Table 4) one can observe that the Primeval and Cultured Nature dimension is far less connected with ES service categories than the Human – Nature dimension (the second dimension). Respondents with a Cultured Nature representation connect most to cultural ES, followed by provisioning and regulating ES. The few respondents adhering to the Primeval Nature representation show a small preference for cultural ES over provisioning and regulating ES. When focusing on individual ES, the Cultured Nature representation connects

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most with the cultural ES aesthetical experiences and historical landscapes, and with the regulating ES habitat provisioning (mainly human influenced habitats). The Primeval Nature representations refer to aesthetical experiences and opportunities for recreation (both are cultural ES), and habitat provisioning and conservation of local species (two regulating ES).

3.2. Dimension 2: Relationship Human – Nature

The relationship between humans and nature is expressed along the second dimension , including two relations: "Nature & Landscape for People" and "People for Nature & Landscape" (see Table 4). The two relations combine two perspectives each. The perspectives are worked out in various pronunciations, that relate to activities in nature and landscape. Table 2 summarises the description of the second dimension.

- The Nature & Landscape for People (N&L4P) relation refers to two perspectives: (a) material elements such as growing food, vegetables or timber, collecting firewood, and economic returns from nature and landscape (productive nature and landscape, professional and for hobby); and (b) immaterial elements such as opportunities for outdoor activities and experiencing nature.
- The People for Nature & Landscape (P4N&L) relation discusses the role of humans in caring for nature. We have structured this role along two perspectives: (a) policy-related elements and (b) nature/landscape management activities. Respondents refer more frequently to N&L4P than to P4N&L.

Members of stakeholder groups (farmers, politicians, etc.) do not homogeneously adhere to particular representations, but some stakeholder group-related patterns emerge (Table 3). Citizens, politicians and farmers refer more to the N&L4P than to P4N&L. Members of environmental NGOs (eNGOs) and civil servants refer equally to both relations.

Elements of the N&L4P relation are mentioned more frequently than elements of the P4N&L relation. Overall, negative opinions towards opportunities for motorised recreation (cultural ES) and towards urbanisation are prominent elements too (both mentioned by all respondents from eNGOs, all farmers and all civil servants, and half the citizens and politicians). Respondents from all groups mention (potential) monetary returns from recreational activities, small-scale tourism or producing and selling regional products, but far less frequent than the elements mentioned earlier. All farmers, some politicians and some eNGO members see landscape management as a source of additional income for farmers (through environmental management grant

Table 2
Overview of the Human – Nature dimension, illustrating the elements composing the second dimension in the social representation in the study area. The most right column lists elements that conflict with or contradict these elements.

Relation	Perspective	Pronunciation	Activity	Contradicting/conflicting elements
Nature & Landscape for People (N&L4P)	Productive Nature & Landscape	Wood production from nature and landscape management	Wood production as direct aim	
			(Fire)wood resulting from landscape management	
		Food production (incl. vegetables & fruits, incl. production of regional products and locally produced food)	Professional	Inappropriate use of agricultural methods (resulting in erosion, floods, pollution)
			Non-professional (e.g. kitchen gardens, roadside plantations)	
		Additional income from nature and landscape management	Farmers participating in environmental management schemes or assisting in managing nature reserves	
		Monetary return from nature and landscape experiences	Through recreational activities & tourism; producing & selling regional products	
	Experiencing Nature & Landscape	Creating opportunities for recreational activities	Walking, cycling, berry picking, horseback riding, playing, fishing, kitchen gardening	Negative impact of motorised recreation (noise, impact on vegetation)
		Creating a pleasant (living/working) environment	Sense of place/local identity	Urbanisation negatively impacts landscape quality
			Aesthetical experiences	
			Relaxation, stress-reduction, health, well-being	
People for Nature & Landscape (P4N&L)	Policy	Nature, landscape and environment policy	Protection status	Nature/landscape conservation and development should not hinder agriculture; agriculture should not be secondary to nature
			Acquiring land for nature conservation	
		External policy domains with impact on nature & landscape	Land use planning, spatial policy, agriculture policy (positive impact)	Negative impact of external policy domains on nature and landscape quality
	Nature and Landscape Management	For regulating game and invasive species	Hunting as regulating management activity	Negative impact of overpopulation (game) or invasive species
		For biodiversity and nature conservation	Nature restoration, nature conservation, improving biodiversity and landscape	Nature/landscape conservation and development should not hinder agriculture; agriculture should not be secondary to nature and/or landscape
		For experiencing nature and landscape	Nature and landscape should look well-managed and clean	Experiencing landscape hindered by careless, unmanaged landscapes
		Role of agriculture	Farmers act as landscape managers: assist in managing nature reserves, planting hedgerows at their land, creating good environmental conditions	Farmers consider themselves as not being respected for managing the landscape and nature
		Role of NGOs	Lobbying and awareness-raising to act for nature and landscape	
			Managing nature	

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Table 3
Differentiation of respondents along the Nature versus Culture and Human-Nature Relationship dimensions.

	Nature versus Culture dimension					Human – Nature Relationship dimension	
	Undetermined	Cultured Nature	Primeval Nature	Cultured & Primeval Nature	Total	Nature & Landscape for People (N&L4P)	People for Nature & Landscape (P4N&L)
Active members of environmental NGOs	0	4	0	3	7	7	7
Farmers	1	2	0	1	4	4	4
Citizens	3	3	2	4	12	12	12
Civil servants	1	2	1	5	9	9	9
Politicians	0	4	0	3	7	7	7
Total	5	15	3	16	39	39	39

schemes, payments for ES or facilitating landscape and nature management activities). Similarly, farmers mention the importance of nature as it provides their livelihood; however, they confront their professional dependence of nature with recreationalists and nature conservationists who use nature for leisure activities (also referring to volunteering). Respondents have opposing views on the use of nature and landscape, e.g. on agricultural methods such as monocultures, pesticides, or other invasive methods that result in erosion, floods, and pollution (so negatively impacting regulating ES as flood protection and erosion control). Half of the citizens, civil servants and politicians, all farmers and most eNGO members refer to these methods and their negative impacts. All farmers admit the (potential) negative impacts of the methods used, but they claim they minimise the environmental impact of their practices. This latter statement holds elements of the role of human actors in the care for nature (ergo the People for Nature & Landscape relation).

As shown in Table 4, the prominent representation in the N&L4P relation connects with (a) the cultural ES delivering aesthetical experiences, recreational opportunities, opportunities for relaxation/therapeutic recovery; and (b) the provisioning ES wood production. To a lesser extent references are made to creating a sense of place (cultural ES), creating a good place to live (cultural ES), food production (provisioning ES) and producing regional products (provisioning ES). In addition, a negative relationship with opportunities for motorised recreation (cultural ES) is prominent in the N&L4P representation, main concerns are noise and vegetation impacts.

In contrast to the N&L4P relation where most elements are mentioned by a majority of the respondents, the P4N&L relation mainly contains elements that are mentioned less frequently (Table 4). The latter relation points to the role of humans in the care for nature through policy and management, ergo a stewardship approach (see the Discussion section for further elaboration). The policy component includes environmental and nature policy (including protecting and acquiring conservation areas), as well as integrating (care for) nature and landscape in other (external) policy domains, especially land use planning. All members of eNGOs, almost all politicians and civil servants, half the citizens and half the farmers refer to nature policy, some in a positive sense, others in a negative sense. Farmers and politicians with clear interest in agriculture are critical towards nature policy and its impact on farming. Moreover, stakeholders diverge in opinions on the impact of external policy domains (all eNGO members, and half the politicians, citizens and civil servants): some measures, decisions and actions impact positively (e.g. sewage networks), others impact negatively (e.g. new residences hindering landscape experiences).

With regard to management, respondents refer to conservation and restoration of nature and landscape by eNGOs (planting trees, providing nesting opportunities) and farmers (cattle grazing in nature reserves, planting hedgerows, avoiding erosion or flooding, other agri-environmental measures). However, farmers and politicians with interests in agriculture state that agriculture cannot be secondary to nature and landscape management and oppose to (further) nature development. The need to control game and invasive species is stated by a majority of respondents from all groups, however, for diverging reasons (ranging from crop protection to nature conservation). All groups, except eNGOs, criticize contemporary nature and landscape management for its unmanaged, careless image.

When linking P4N&L with the ES classification (Table 4) the most connected ES are habitat provisioning (regulating ES) and hunting (provisioning ES, but exclusively mentioned for its regulating role). Less frequently, respondents mention education and aesthetical experiences (two cultural ES that include a strong human agency), and four regulating ES where human influence is important (protection against floods, erosion control, conservation of local species, regulating pests and diseases). The provisioning ES "employment in nature and landscape management" is an inherent expression of the idea of humans caring for nature (that in turn delivers a monetary return to the employees).

Finally, the comparison of the Human-Nature relations with the ES classification categories (Table 4) learns that all respondents appear to mention cultural and provisioning ES when discussing the N&L4P relation. Provisioning ES dominate the P4N&L relation, while cultural and regulating ES are equally important. In the P4N&L relation more respondents mention regulating ES than in the N&L4P relation: mainly farmers and active members of eNGOs adhere more to P4N&L than to N&L4P. But whereas farmers focus more on active human interventions in nature and landscape, eNGO members adhere more to a human agency in the care for nature.

4. Discussion

4.1. Empirical social representations of nature challenge the theoretical ES concept and classical ES classifications

This article analyses stakeholders' social representations of nature and confronts these with the representation of nature implemented in the ES concept. Our results challenge the theoretical ES concept and classical ES classification schemes in several ways.

Firstly, salient elements of the social representations of nature with the stakeholders in the area studied are based on the Cultured Nature relation and perspectives from the N&L4P relation (wood and food production, creating opportunities for recreation and a pleasant environment and landscape). Both relations are congruent with the anthropocentric definition of ES, namely ecosystems providing benefits to human society. However, our respondents do not consider ecosystems solely as "service providers" to humanity, but also point to the responsibility of humans for protecting ecosystems and sustaining their capacity to serve humanity instead of relying on ecosystem services to buffer and remediate the negative impact of humanity on ecosystems (see Arias-Arévalo et al., 2017; Moreno et al., 2014; Palomo et al., 2014 for silimar results). For example, some respondents suggest that natural

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Table 4
Number of respondents whose social representation of nature and landscape refers to ecosystem services (individual ES & ES categories).

	Primeval Nature						Cultured Nature						Nature & Landscape for People (N&L4P)						People for Nature & Lands		
	Env. NGO	Farmer	Citizen	Civil Servant	Politician	SUM	Env. NGO	Farmer	Citizen	Civil Servant	Politician	SUM	Env. NGO	Farmer	Citizen	Civil Servant	Politician	SUM	Env. NGO	Farmer	Citize
Number of respondents	*7*	*4*	*12*	*9*	*7*	*39*	*7*	*4*	*12*	*9*	*7*	*39*	*7*	*4*	*12*	*9*	*7*	*39*	*7*	*4*	*12*
ES categories																					
Provisioning services[a]	**0**	**0**	**2**	**1**	**0**	**3**	**1**	**3**	**2**	**1**	**5**	**12**	**7**	**4**	**12**	**9**	**7**	**39**	**7**	**4**	**8**
Wood production						0		1	1		1	3	6	4	12	6	5	33	3	2	1
Biofuel production						0						0		2		1	2	5			
Food production						0		3	2		1	6	5	3	10	3	6	27	2	1	2
Producing regional products						0		1	2		1	4	5	4	6	6	6	27	2	1	
Hunting opportunities						0				1	3	4		1	1		2	4	2	3	8
Producing berries & wild fruits						0	1	1	2		2	6	4	1	10	3	4	22	1	1	
Employment in agriculture						0	1	1	2	1		5	3	3	3	3	2	14	4	1	3
Employment in nature/landscape management			2	1		3	1	1	1	1		4	2	3	5	1		11	5	4	1
Employment in recreation & tourism			1			1						0	3	1	3	4	2	13	1		
Increased real estate prices						0						0	2				2	4	1		
Subtotal	0	0	3	1	0	4	3	8	10	3	8	32	30	22	50	27	31	160	21	13	15
Subtotal (%)[b]	0%	0%	43%	8%	0%	15%	14%	36%	34%	12%	19%	23%	35%	43%	36%	29%	31%	34%	31%	39%	29%
Regulating services[a]	**1**	**0**	**0**	**2**	**1**	**4**	**1**	**2**	**2**	**2**	**5**	**12**	**3**	**1**	**6**	**4**	**7**	**21**	**6**	**3**	**6**
Natural water purification						0	1					1	2		1			3	1		3
Natural air purification						0				2	2	4	2		3	4	1	10			1
Climate regulation				1		1		1			1	2		1	1		2	4		1	
Carbon storage						0				1		1			1	1	1	3			1
Protection against floods	1			1		2			1	2	4	7	1	1		2	2	6	5		3
Erosion control						0		2	1		1	4		1	1		1	3	4	3	4
Regulating pests and diseases				1	1	2		1				1			1			1	1	3	5
Protection against noise						0				2	2	4			2	4	3	9	1		
Habitat provisioning				2		2	1	1	2	2	4	10	3		4	1	5	13	6	2	6
Conservation of local species				1		1	3		2	2	1	8	1		2	1		4	3	2	2
Pollination					1	1	1				1	2	1		1		2	4	1	1	
Subtotal	1	0	0	6	2	9	6	5	6	11	16	44	10	3	17	13	17	60	22	12	25
Subtotal (%)[b]	25%	0%	0%	50%	67%	35%	29%	23%	21%	42%	38%	31%	12%	6%	12%	14%	17%	13%	32%	36%	49%
Cultural services[a]	**1**	**0**	**1**	**2**	**1**	**5**	**4**	**2**	**5**	**3**	**5**	**19**	**7**	**4**	**12**	**9**	**7**	**39**	**7**	**3**	**4**
Recreational opportunities			1	1		2		1	2	1	2	6	7	4	11	9	8	39	3	1	1
Motorized recreation				1		1				1		1	2	1	2	5	4	14			1
Aesthetical experiences	1		1	1	1	4	4	2	5	2	4	17	7	4	12	9	7	39	4	2	3
Spiritual experiences				1		1		1				1	3	4	6	3	3	19			

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Table 4 (*Continued*)

	Primeval Nature						Cultured Nature						Nature & Landscape for People (N&L4P)						People for Nature & Lands		
	Env. NGO	Farmer	Citizen	Civil Servant	Politician	SUM	Env. NGO	Farmer	Citizen	Civil Servant	Politician	SUM	Env. NGO	Farmer	Citizen	Civil Servant	Politician	SUM	Env. NGO	Farmer	Citize
Therapeutic recovery/ Relaxation				1		1		2			1	3	5	4	11	9	8	37		2	
Education						0	2	1	2	2	1	8	4	2	6	5	1	18	8	1	3
Opportunities for social relations						0	1	1				2	3	2	3	1	2	11	1	1	
Opportunities for science						0			1			1	1				1	2	1		1
Creating a good place to live						0				2	3	5	5	2	8	8	6	29	1		
Creating a sense of place	1					1	1		1	1	3	6	6	2	10	5	8	31	3		1
Historical landscapes	1		2			3	4	1	2	3	4	14	2	1	3		2	8	4	1	1
Subtotal	3	0	4	5	1	13	12	9	13	12	18	64	45	26	72	54	51	248	25	8	11
Subtotal (%)[b]	75%	0%	57%	42%	33%	50%	57%	41%	45%	46%	43%	46%	53%	51%	52%	57%	52%	53%	37%	24%	22%
Total	4	0	7	12	3	26	21	22	29	26	42	140	85	51	139	94	99	468	68	33	51

Notes

[a] Numbers represent the number of respondents whose representation of nature connects to one or more ES within the ES category.

[b] Proportional to the aggregated number of respondents (within the same group) whose representation of nature connects to individual ES.

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water purification (a regulating ES) is important, but that society has to provide sewage and water purification systems instead of relying on nature to do the work. In this sense, the P4N&L relation fits with a stewardship representation, which regards humans as "the caretakers of nature who see nature as a subtle, fragile system to be handled with care and precaution for the benefit of humankind" (de Groot et al., 2006, p. 12). Other respondents mention the human responsibility to protect nature and keep the environment in a good environmental condition. They argue for active human regulation of nature and landscape, in particular because the negative human impact on nature has gone beyond the capacity of nature to restore itself. Clearly, social representations in the P4N&L relation deal with active interventions of humans in nature and landscape, both with the aim to support nature (as in the stewardship representation), and to regulate nature (game, invasive species). Importantly, these findings underlie the significance of human agency in social representations of nature. This is in contrast to classical ES representation in which human agency is omitted or limited to negative impacts. This lack of recognition has been criticised by scholars (e.g. Lele et al., 2013; Spangenberg et al., 2014a) in the sense that obtaining benefits from ecosystem processes usually requires human labour and capital for harnessing the service. Fischer and Eastwood (2016) and Barnaud et al. (2018) propose adopting a "co-production" lens, which highlights the active and diverse role of humans in ES production.

Secondly, our results challenge the classical divide between provisioning, regulating, cultural and supporting ES. In particular, the categorisation of cultural ES (CES) as separate from provisioning and regulating services should be reconsidered. Several CES (recreation, aesthetical experiences, sense of place/local identity, relaxation, human well-being) appear an essential part of the social representations of all the interviewees. But we notice that provisioning ES such as producing wild berries, regional products and wood are at least as important for experiencing nature (CES) as for the direct economic return they generate (see Arias-Arévalo et al., 2018; Barthel et al., 2010; Chan et al., 2012; Cooper et al., 2016; Plieninger et al., 2015; Queiroz et al., 2017; Van Herzele and Van Gossum, 2008 for similar observations). These observations suggest the need for a critical reconsideration of ES classification frameworks, because many CES are inextricably intertwined with regulating and provisioning services (Chan et al., 2016; Fish et al., 2016; Pascua et al., 2017). As insight in CES and methodologies for assessing CES are less developed than for other ES categories, applying the social representation approach in further ES research can contribute to identifying CES and to developing improved ES classification schemes through conceptualising common knowledge, parallel with expert knowledge (Gould and Lincoln, 2017; Raymond et al., 2010; Stålhammar and Pedersen, 2017).

Thirdly, the social representation approach can contribute to current knowledge and understanding of relational values and shared values regarding ecosystems and their services. For instance, the unanimity on the N&L4P relation (all respondents refer to this relation) indicates the existence of shared values compatible with the instrumental, anthropocentric viewpoint in the theoretical ES concept. The diverging stances within the P4N&L relation are examples of diverging relational values, describing different views on human-nature relationships. Whereas the P4N&L relation is relevant for all stakeholders, it is understood and practiced in different ways. In other words, there appears a societal consensus on a role for humans in nature and landscape, but not on how the human agency towards nature and landscape can be fulfilled. The findings suggest that these relational values are depending on contexts, are closely related to the particular role and position of the stakeholder in question, and tend to be shared, to some extent, by members of the same stakeholder group. Further research should look into the applicability of the social representations approach to uncover the shared and relational values that matter to diverging groups of people, and as such stimulate future research directions for ES research and practice (Costanza et al., 2017; Jacobs et al., 2016; Kenter et al., 2016). To summarise, we illustrated that the theoretical ES concept and classical ES classifications are only partially capturing stakeholders' social representations of nature and landscape. The identified incompatibility between stakeholders' social representations of nature and the ES concept leads to important considerations regarding its application in ES-based assessments and decision-making processes (see further below).

4.2. Social representations of nature for operationalising participatory ES assessments

Social representations give insight into the different values, value systems and value domains (Boeraeve et al., 2015; Cundill et al., 2017; Spangenberg et al., 2014b) relevant for stakeholders in a given area. An in-depth understanding of shared and unshared elements is a way to decrease mutual incomprehension, to find a common ground for deliberation and discussion on planning and managing ecosystems and their services, and to formulate solutions that comply with diverging social representations (see also Barnaud and Antona, 2014; Buijs et al., 2012; Raymond et al., 2014). Particularly in peri-urban landscapes, with typically high competition for land and conflicting visions on management and planning (see e.g. Buijs et al., 2011; Lawrence et al., 2013; Van Herzele, 2006), the social representation technique could support the deliberation over policies, land use plans, or management approaches.

As we have illustrated above, the classical ES concept and scientific standardised classifications (such as the MEA or CICES classifications) do not necessarily converge with stakeholders' social representations of nature (see Arias-Arévalo et al., 2018; Flint et al., 2013). Consequently, if certain values are not fully captured, the wellbeing of stakeholders who adhere to these values is neglected (Jax et al., 2013). Moreover, as Jax et al. (2013) suggests, focussing exclusively on traditional ES-related values (instrumental values, intrinsic values) excludes ethical questions and normative aspects relevant for specific stakeholders, leading to issues of injustice and lacking legitimacy. Based on our results, we suggest that especially relational values tend to be overlooked in the ES concept. This is problematic because it is precisely these context-specific relational values that can motivate stakeholders the most to participate in the planning process. In addition to the social representations approach, concepts like place identity, place attachment (Cundill et al., 2017) and co–production (Barnaud et al., 2018; Fischer and Eastwood, 2016) could help in integrating relational values into participatory ES assessments.

In general, adjusting ES assessments to stakeholders' representations will lead to assessments that better reflect the issues at stake in the study area and stakeholders will feel more connected to the assessment process and its results (Boeraeve et al., 2018; Jacobs et al., 2016; Orenstein and Groner, 2014; Queiroz et al., 2017), which will increase the process impact on policy, planning and management in "real life" (beyond academic exercises) (Hansen et al., 2015; Primmer and Furman, 2012; Willcock et al., 2016). Finally, although the described social representations of nature are context-dependent and probably only valid in urbanising Western European regions (Benford and Snow, 2000; Ernstson and Sörlin, 2013), we suggest that similar divergences could explain disappointing implementation of participatory ES-based planning and management processes, despite the increasing popularity of the ES concept in policy and research.

5. Conclusion

This paper demonstrates that and describes how the theoretical ES concept deviates markedly from empirically grounded social represen-

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tations of nature across different stakeholders in a peri-urbanised study area in Western Europe. The social representations identified in our study are only in part compatible with the theoretical ES concept. This pertains in particular the anthropocentric, instrumental elements shared by all stakeholders. But other elements in stakeholders' representations of nature, and more specifically those that capture the often context-dependent human-nature relationships (ergo relational values), and the specific roles of human agency therein, are incompatible with the ES concept. Furthermore, stakeholders' representations of nature regarding both cultural and regulating benefits obtained from nature are not converging with traditional ES classifications.

This has implications for the employment of the ES concept and classical ES classifications in science-practice-policy processes. We warn against applying the standard theoretical ES concept when this is not congruent with stakeholders' representations of nature. Apart from missing out values and services that are important for stakeholders, applying a ES concept that not overlaps with stakeholders' representations can have negative impacts on stakeholders' well-being and the legitimacy of the process and its outcomes. Imposing a standardised ES framework precludes stakeholders from articulating human-nature relationships in any other way.

We described how a social representations approach can be a potential novel approach to get insight in shared and relational values related to ecosystem services. Insight in – and recognition of – local social representations of nature can support participatory deliberation on planning and management of natural resources, and facilitate solutions that are grounded in, and comply with, multiple social representations of nature. Further research shall explore the employment of social representations as an approach for describing relational and shared values, and how diverging social representations should be taken into consideration in ES-based research and practice.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ecoser.2019.100911.

References

Abson, D.J., von Wehrden, H., Baumgärtner, S., Fischer, J., Hanspach, J., Härdtle, W., Heinrichs, H., Klein, A.M., Lang, D.J., Martens, P., Walmsley, D., 2014. Ecosystem services as a boundary object for sustainability. Ecol. Econ. 103, 29–37. https://doi.org/10.1016/j.ecolecon.2014.04.012.

Anderson, N.M., Williams, K.J.H., Ford, R.M., 2013. Community perceptions of plantation forestry: the association between place meanings and social representations of a contentious rural land use. J. Environ. Psychol. 34, 121–136. https://doi.org/10.1016/j.jenvp.2013.02.001.

Arias-Arévalo, P., Gómez-Baggethun, E., Martín-López, B., Pérez-Rincón, M., 2018. Widening the Evaluative Space for Ecosystem Services: A Taxonomy of Plural Values and Valuation Methods. Environ. Values 27, 29–53. https://doi.org/10.3197/096327118X15144698637513.

Arias-Arévalo, P., Martín-López, B., Gómez-Baggethun, E., 2017. Exploring intrinsic, instrumental, and relational values for sustainable management of social-ecological systems. Ecol. Soc. 22, https://doi.org/10.5751/ES-09812-220443.

Asah, S.T., Guerry, A.D., Blahna, D.J., Lawler, J.J., 2014. Perception, acquisition and use of ecosystem services: Human behavior, and ecosystem management and policy implications. Ecosyst. Serv. 10, 180–186. https://doi.org/10.1016/j.ecoser.2014.08.003.

Barnaud, C., Antona, M., 2014. Deconstructing ecosystem services: uncertainties and controversies around a socially constructed concept. Geoforum 56, 113–123. https://doi.org/10.1016/j.geoforum.2014.07.003.

Barnaud, C., Corbera, E., Muradian, R., Salliou, N., Sirami, C., Vialatte, A., Choisis, J.-P., Dendoncker, N., Mathevet, R., Moreau, C., Reyes-García, V., Boada, M., Deconchat, M., Cibien, C., Garnier, S., Maneja, R., Antona, M., 2018. Ecosystem services, social interdependencies, and collective action: a conceptual framework. Ecol. Soc. 23, https://doi.org/10.5751/ES-09848-230115.

Barthel, S., Folke, C., Colding, J., 2010. Social–ecological memory in urban gardens—retaining the capacity for management of ecosystem services. Glob. Environ. Change 20, 255–265. https://doi.org/10.1016/j.gloenvcha.2010.01.001.

Beery, T., Stålhammar, S., Jönsson, K.I., Wamsler, C., Bramryd, T., Brink, E., Ekelund, N., Johansson, M., Palo, T., Schubert, P., 2016. Perceptions of the ecosystem services concept: opportunities and challenges in the Swedish municipal context. Ecosyst. Serv. 17, 123–130. https://doi.org/10.1016/j.ecoser.2015.12.002.

Benford, R.D., Snow, D.A., 2000. Framing processes and social movements: an overview and assessment. Annu. Rev. Sociol. 611–639.

Berbés-Blázquez, M., González, J.A., Pascual, U., 2016. Towards an ecosystem services approach that addresses social power relations. Curr. Opin. Environ. Sustain Sustain. Sci. 19, 134–143. https://doi.org/10.1016/j.cosust.2016.02.003.

Blicharska, M., Van Herzele, A., 2015. What a forest? Whose forest? Struggles over concepts and meanings in the debate about the conservation of the Białowieża Forest in Poland. For. Policy Econ. 57, 22–30. https://doi.org/10.1016/j.forpol.2015.04.003.

Boeraeve, F., Dendoncker, N., Jacobs, S., Gómez-Baggethun, E., Dufrêne, M., 2015. How (not) to perform ecosystem service valuations: pricing gorillas in the mist. Biodivers. Conserv. 24, 187–197. https://doi.org/10.1007/s10531-014-0796-1.

Boeraeve, F., Dufrene, M., De Vreese, R., Jacobs, S., Pipart, N., Turkelboom, F., Verheyden, W., Dendoncker, N., 2018. Participatory identification and selection of ecosystem services: building on field experiences. Ecol. Soc. 23, https://doi.org/10.5751/ES-10087-230227.

Bryan, B.A., Raymond, C.M., Crossman, N.D., MacDonald, D.H., 2010. Targeting the management of ecosystem services based on social values: where, what, and how?. Landsc. Urban Plan. 97, 111–122. https://doi.org/10.1016/j.landurbplan.2010.05.002.

Buijs, A.E., Arts, B.J.M., Elands, B.H.M., Lengkeek, J., 2011. Beyond environmental frames: the social representation and cultural resonance of nature in conflicts over a Dutch woodland. Geoforum 42, 329–341. https://doi.org/10.1016/j.geoforum.2010.12.008.

Buijs, A.E., Fischer, A., Rink, D., Young, J.C., 2008. Looking beyond superficial knowledge gaps: understanding public representations of biodiversity. Int. J. Biodivers. Sci. Ecosyst. Serv. Manag. 4, 65–80. https://doi.org/10.3843/Biodiv.4.2:1.

Buijs, A.E., Hovardas, T., Figari, F., Castro, P., Devine-Wright, P., Fischer, A., Mouro, C., Selge, S., 2012. Understanding People's Ideas on Natural Resource Management: Research on Social Representations of Nature. Soc. Amp Nat. Resour. 25, 1167–1181. https://doi.org/10.1080/08941920.2012.670369.

Cast, A., MacDonald, D.H., Grandgirard, A., Kalivas, T., Strathearn, S., Sanderson, M., Bryan, B.A., Frahm, D., 2008. South Australian Murray-Darling Basin Environmental Values Report, Water for a Healthy Country Flagship Report series. CSIRO, Glen Osmond.

Chan, K.M.A., Balvanera, P., Benessaiah, K., Chapman, M., Díaz, S., Gómez-Baggethun, E., Gould, R., Hannahs, N., Jax, K., Klain, S., Luck, G.W., Martín-López, B., Muraca, B., Norton, B., Ott, K., Pascual, U., Satterfield, T., Tadaki, M., Taggart, J., Turner, N., 2016. Opinion: why protect nature? Rethinking values and the environment. Proc. Natl. Acad. Sci. 113, 1462–1465. https://doi.org/10.1073/pnas.1525002113.

Chan, K.M.A., Satterfield, T., Goldstein, J., 2012. Rethinking ecosystem services to better address and navigate cultural values. Ecol. Econ. 74, 8–18. https://doi.org/10.1016/j.ecolecon.2011.11.011.

Cooper, N., Brady, E., Steen, H., Bryce, R., 2016. Aesthetic and spiritual values of ecosystems: recognising the ontological and axiological plurality of cultural ecosystem 'services'. Ecosyst. Serv., Shared, plural and cultural values **21 Part B** 218–229. https://doi.org/10.1016/j.ecoser.2016.07.014.

Costanza, R., de Groot, R., Braat, L., Kubiszewski, I., Fioramonti, L., Sutton, P., Farber, S., Grasso, M., 2017. Twenty years of ecosystem services: How far have we come and how far do we still need to go?. Ecosyst. Serv. 28, 1–16. https://doi.org/10.1016/j.ecoser.2017.09.008.

Cundill, G., Bezerra, J.C., De Vos, A., Ntingana, N., 2017. Beyond benefit sharing: Place attachment and the importance of access to protected areas for surrounding communities. Ecosyst. Serv Protected area services 28, 140–148. https://doi.org/10.1016/j.ecoser.2017.03.011.

Curtis, D.J.R., Wenrich, M.D., Carline, J.D., Shannon, S.E., Ambrozy, D.M., Ramsey, P.G., 2001. Understanding physicians' skills at providing end-of-life care. J. Gen. Intern. Med. 16, 41–49. https://doi.org/10.1046/j.1525-1497.2001.00333.x.

Czúcz, B., Arany, I., Potschin-Young, M., Bereczki, K., Kertész, M., Kiss, M., Aszalós, R., Haines-Young, R., 2018. Where concepts meet the real world: a systematic review of ecosystem service indicators and their classification using CICES. Ecosyst. Serv. 29, 145–157. https://doi.org/10.1016/j.ecoser.2017.11.018.

de Groot, W.T., van den Born, Riyan J.G., Lenders, R.H.J., 2006. Visions of Nature. An introduction. In: van den Born, R.J.G., Groot, W.T.D., Lenders, R.H.J. (Eds.), Visions of Nature: A Scientific Exploration of People's Implicit Philosophies Regarding Nature in Germany. LIT Verlag Münster, pp. 7–18.

De Vreese, R., Leys, M., Dendoncker, N., Van Herzele, A., Fontaine, C.M., Images of nature as a boundary object in social and integrated ecosystem services assessments.

UNCORRECTED PROOF

Reflections from a Belgian case study. *Ecosyst. Serv.* **22 Part B**, 2016a, 269–279. https://doi.org/10.1016/j.ecoser.2016.06.008

De Vreese, R., Leys, M., Fontaine, C.M., Dendoncker, N., 2016. Social mapping of perceived ecosystem services supply – the role of social landscape metrics and social hotspots for integrated ecosystem services assessment, landscape planning and management. Ecol. Indic. 66, 517–533. https://doi.org/10.1016/j.ecolind.2016.01.048.

Díaz, S., Demissew, S., Carabias, J., Joly, C., Lonsdale, M., Ash, N., Larigauderie, A., Adhikari, J.R., Arico, S., Báldi, A., Bartuska, A., Baste, I.A., Bilgin, A., Brondizio, E., Chan, K.M., Figueroa, V.E., Duraiappah, A., Fischer, M., Hill, R., Koetz, T., Leadley, P., Lyver, P., Mace, G.M., Martín-López, Berta, B., Okumura, M., Pacheco, D., Pascual, U., Pérez, E.S., Reyers, B., Roth, E., Saito, O., Scholes, R.J., Sharma, N., Tallis, H., Thaman, R., Watson, R., Yahara, T., Hamid, Z.A., Akosim, C., Al-Hafedh, Y., Allahverdiyev, R., Amankwah, E., Asah, S.T., Asfaw, Z., Bartus, G., Brooks, L.A., Caillaux, J., Dalle, G., Darnaedi, D., Driver, A., Erpul, G., Escobar-Eyzaguirre, P., Failler, P., Fouda, A.M.M., Fu, B., Gundimeda, H., Hashimoto, S., Homer, F., Lavorel, S., Lichtenstein, G., Mala, W.A., Mandivenyi, W., Matczak, P., Mbizvo, C., Mehrdadi, M., Metzger, J.P., Mikissa, J.B., Moller, H., Mooney, H.A., Mumby, P., Nagendra, H., Nesshover, C., Oteng-Yeboah, A.A., Pataki, G., Roué, M., Rubis, J., Schultz, M., Smith, P., Sumaila, R., Takeuchi, K., Thomas, S., Verma, M., Yeo-Chang, Y., Zlatanova, D. The IPBES Conceptual Framework — connecting nature and people. *Curr. Opin. Environ. Sustain.* **14**, 2015, 1–16. https://doi.org/10.1016/j.cosust.2014.11.002

Ernstson, H., Sörlin, S., 2013. Ecosystem services as technology of globalization: on articulating values in urban nature. *Ecol. Econ* 86, 274–284. https://doi.org/10.1016/j.ecolecon.2012.09.012.

Fischer, A., Eastwood, A., 2016. Coproduction of ecosystem services as human–nature interactions—an analytical framework. Land Use Policy 52, 41–50. https://doi.org/10.1016/j.landusepol.2015.12.004.

Fish, R., Church, A., Winter, M., 2016. Conceptualising cultural ecosystem services: a novel framework for research and critical engagement. Ecosyst. Serv. 21, 208–217. https://doi.org/10.1016/j.ecoser.2016.09.002.

Flint, C.G., Kunze, I., Muhar, A., Yoshida, Y., Penker, M., 2013. Exploring empirical typologies of human–nature relationships and linkages to the ecosystem services concept. Landsc. Urban Plan. 120, 208–217. https://doi.org/10.1016/j.landurbplan.2013.09.002.

Folkersen, M.V., 2018. Ecosystem valuation: changing discourse in a time of climate change. Ecosyst. Serv. 29, 1–12. https://doi.org/10.1016/j.ecoser.2017.11.008.

Fontaine, C.M., Dendoncker, N., De Vreese, R., Jacquemin, I., Marek, A., Van Herzele, A., Devillet, G., Mortelmans, D., François, L., 2013. Participatory Valuation and Modelling of Ecosystem Services under Land Use Change. J. Land Use Sci. 9, 278–303. https://doi.org/10.1080/1747423X.2013.786150.

Gould, R.K., Lincoln, N.K., 2017. Expanding the suite of Cultural Ecosystem Services to include ingenuity, perspective, and life teaching. Ecosyst. Serv. 25, 117–127. https://doi.org/10.1016/j.ecoser.2017.04.002.

Hansen, R., Frantzeskaki, N., McPhearson, T., Rall, E., Kabisch, N., Kaczorowska, A., Kain, J.-H., Artmann, M., Pauleit, S., 2015. The uptake of the ecosystem services concept in planning discourses of European and American cities. Ecosyst. Serv. 12, 228–246. https://doi.org/10.1016/j.ecoser.2014.11.013.

Hauck, J., Görg, C., Varjopuro, R., Ratamäki, O., Jax, K., 2013. Benefits and limitations of the ecosystem services concept in environmental policy and decision making: some stakeholder perspectives. Environ. Sci. Policy 25, 13–21. https://doi.org/10.1016/j.envsci.2012.08.001.

Hsieh, H.-F., Shannon, S.E., 2005. Three Approaches to Qualitative Content Analysis. Qual. Health Res. 15, 1277–1288. https://doi.org/10.1177/1049732305276687.

Irvine, K.N., O'Brien, L., Ravenscroft, N., Cooper, N., Everard, M., Fazey, I., Reed, M.S., Kenter, J.O., 2016. Ecosystem services and the idea of shared values. Ecosyst. Serv. **21 Part B,** 184–193. https://doi.org/10.1016/j.ecoser.2016.07.001.

Jacobs, Sander, Dendoncker, Nicolas, Martín-López, Berta, Barton, David Nicholas, Gomez-Baggethun, Erik, Boeraeve, Fanny, McGrath, Francesca L., Vierikko, Kati, Geneletti, Davide, Sevecke, Katharina J., Pipart, Nathalie, Primmer, Eeva, Mederly, Peter, Schmidt, Stefan, Aragão, Alexandra, Baral, Himlal, Bark, Rosalind H., Briceno, Tania, Brogna, Delphine, Cabral, Pedro, De Vreese, Rik, Liquete, Camino, Mueller, Hannah, Peh, Kelvin S.-H., Phelan, Anna, Rincón, Alexander R., Rogers, Shannon H., Turkelboom, Francis, Van Reeth, Wouter, van Zanten, Boris T., Wam, Hilde Karine, Washbourne, Carla-Leanne, 2016. A new valuation school: integrating diverse values of nature in resource and land use decisions. Ecosyst. Serv. 22, 213–220. https://doi.org/10.1016/j.ecoser.2016.11.007.

Jax, K., Barton, D.N., Chan, K.M.A., de Groot, R., Doyle, U., Eser, U., Görg, C., Gómez-Baggethun, E., Griewald, Y., Haber, W., Haines-Young, R., Heink, U., Jahn, T., Joosten, H., Kerschbaumer, L., Korn, H., Luck, G.W., Matzdorf, B., Muraca, B., Neßhöver, C., Norton, B., Ott, K., Potschin, M., Rauschmayer, F., von Haaren, C., Wichmann, S., 2013. Ecosystem services and ethics. Ecol. Econ. 93, 260–268. https://doi.org/10.1016/j.ecolecon.2013.06.008.

Kenter, Jasper O., 2016. Integrating deliberative monetary valuation, systems modelling and participatory mapping to assess shared values of ecosystem services. Ecosyst. Serv. 21, 291–307. https://doi.org/10.1016/j.ecoser.2016.06.010.

Kenter, Jasper O., 2016. Editorial: shared, plural and cultural values. Ecosyst. Serv. 21, 175–183. https://doi.org/10.1016/j.ecoser.2016.10.010.

Kenter, J.O., Bryce, R., Christie, M., Cooper, N., Hockley, N., Irvine, K.N., Fazey, I., O'Brien, L., Orchard-Webb, J., Ravenscroft, N., Raymond, C.M., Reed, M.S., Tett, P., Watson, V., 2016. Shared values and deliberative valuation: future directions. Ecosyst. Serv. 21, 358–371. https://doi.org/10.1016/j.ecoser.2016.10.006.

Kenter, J.O., O'Brien, L., Hockley, N., Ravenscroft, N., Fazey, I., Irvine, K.N., Reed, M.S., Christie, M., Brady, E., Bryce, R., Church, A., Cooper, N., Davies, A., Evely, A., Everard, M., Fish, R., Fisher, J.A., Jobstvogt, N., Molloy, C., Orchard-Webb, J., Ranger, S., Ryan, M., Watson, V., Williams, S., 2015. What are shared and social values of ecosystems?. Ecol. Econ. 111, 86–99. https://doi.org/10.1016/j.ecolecon.2015.01.006.

Laurans, Y., Rankovic, A., Billé, R., Pirard, R., Mermet, L., 2013. Use of ecosystem services economic valuation for decision making: questioning a literature blindspot. J. Environ. Manage. 119, 208–219. https://doi.org/10.1016/j.jenvman.2013.01.008.

Lawrence, A., De Vreese, R., Johnston, M., Konijnendijk van den Bosch, C.C., Sanesi, G., 2013. Urban forest governance: towards a framework for comparing approaches. Urban For. Urban Green. 12, 464–473. https://doi.org/10.1016/j.ufug.2013.05.002.

Lele, S., Springate-Baginski, O., Lakerveld, R., Deb, D., Dash, P., 2013. Ecosystem Services: Origins, Contributions, Pitfalls, and Alternatives. Conserv. Soc. 11, 343. https://doi.org/10.4103/0972-4923.125752.

Mascarenhas, A., Ramos, T.B., Haase, D., Santos, R., 2014. Integration of ecosystem services in spatial planning: a survey on regional planners' views. Landsc. Ecol. 29, 1287–1300. https://doi.org/10.1007/s10980-014-0012-4.

Millennium Ecosystem Assessment, 2005. Ecosystems and human well-being : synthesis. Island Press, Washington DC.

Moreno, J., Palomo, I., Escalera, J., Martín-López, B., Montes, C., 2014. Incorporating ecosystem services into ecosystem-based management to deal with complexity: a participative mental model approach. Landsc. Ecol. 29, 1407–1421. https://doi.org/10.1007/s10980-014-0053-8.

Moscovici, S., 2000. Social representation: explorations in social psychology. Camb. Polity.

Muraca, B., 2011. The map of moral significance: a new axiological matrix for environmental ethics. Environ. Values 20, 375–396.

Orenstein, D.E., Groner, E., 2014. In the eye of the stakeholder: changes in perceptions of ecosystem services across an international border. Ecosyst. Serv. 8, 185–196. https://doi.org/10.1016/j.ecoser.2014.04.004.

Palomo, I., Martín-López, B., Zorrilla-Miras, P., Amo, D.G.D., Montes, C., 2014. Deliberative mapping of ecosystem services within and around Doñana National Park (SW Spain) in relation to land use change. Reg. Environ. Change 14, 237–251. https://doi.org/10.1007/s10113-013-0488-5.

Pascua, P., McMillen, H., Ticktin, T., Vaughan, M., Winter, K.B., 2017. Beyond services: a process and framework to incorporate cultural, genealogical, place-based, and indigenous relationships in ecosystem service assessments. Ecosyst. Serv. 26, 465–475. https://doi.org/10.1016/j.ecoser.2017.03.012.

Plieninger, T., Bieling, C., Fagerholm, N., Byg, A., Hartel, T., Hurley, P., López-Santiago, C.A., Nagabhatla, N., Oteros-Rozas, E., Raymond, C.M., van der Horst, D., Huntsinger, L., 2015. The role of cultural ecosystem services in landscape management and planning. Curr. Opin. Environ. Sustain. 14, 28–33. https://doi.org/10.1016/j.cosust.2015.02.006.

Primmer, E., Furman, E., 2012. Operationalising ecosystem service approaches for governance: do measuring, mapping and valuing integrate sector-specific knowledge systems?. Ecosyst. Serv. 1, 85–92. https://doi.org/10.1016/j.ecoser.2012.07.008.

Queiroz, L. de S., Rossi, S., Calvet-Mir, L., Ruiz-Mallén, I., García-Betorz, S., Salvà-Prat, J., Meireles, A.J. de A., 2017. Neglected ecosystem services: highlighting the socio-cultural perception of mangroves in decision-making processes. Ecosyst. Serv. 26, 137–145. https://doi.org/10.1016/j.ecoser.2017.06.013.

Quétier, F., Rivoal, F., Marty, P., de Chazal, J., Thuiller, W., Lavorel, S., 2010. Social representations of an alpine grassland landscape and socio-political discourses on rural development. Reg. Environ. Change 10, 119–130.

Raymond, C.M., Bryan, B.A., MacDonald, D.H., Cast, A., Strathearn, S., Grandgirard, A., Kalivas, T., 2009. Mapping community values for natural capital and ecosystem services. Ecol. Econ. 68, 1301–1315. https://doi.org/10.1016/j.ecolecon.2008.12.006.

Raymond, C.M., Fazey, I., Reed, M.S., Stringer, L.C., Robinson, G.M., Evely, A.C., 2010. Integrating local and scientific knowledge for environmental management. J. Environ. Manage. 91, 1766–1777. https://doi.org/10.1016/j.jenvman.2010.03.023.

Raymond, C.M., Kenter, J.O., Plieninger, T., Turner, N.J., Alexander, K.A., 2014. Comparing instrumental and deliberative paradigms underpinning the assessment of social values for cultural ecosystem services. Ecol. Econ. 107, 145–156. https://doi.org/10.1016/j.ecolecon.2014.07.033.

Scholte, S.S.K., van Teeffelen, A.J.A., Verburg, P.H., 2015. Integrating socio-cultural perspectives into ecosystem service valuation: a review of concepts and methods. Ecol. Econ. 114, 67–78. https://doi.org/10.1016/j.ecolecon.2015.03.007.

Spangenberg, J.H., Görg, C., Truong, D.T., Tekken, V., Bustamante, J.V., Settele, J., 2014. Provision of ecosystem services is determined by human agency, not ecosystem functions. Four case studies. Int. J. Biodivers. Sci. Ecosyst. Serv. Manag. 10, 40–53. https://doi.org/10.1080/21513732.2014.884166.

Spangenberg, J.H., von Haaren, C., Settele, J., 2014. The ecosystem service cascade: further developing the metaphor. Integrating societal processes to accommodate social processes and planning, and the case of bioenergy. Ecol. Econ. 104, 22–32. https://doi.org/10.1016/j.ecolecon.2014.04.025.

Stålhammar, S., Pedersen, E., 2017. Recreational cultural ecosystem services: How do people describe the value?. Ecosyst. Serv. 26, 1–9. https://doi.org/10.1016/j.ecoser.2017.05.010.

Statistics Belgium, 2015. Fiscal incomes - Statistics and Analyses [WWW Document]. Fisc. Inkom. - Stat. Anal. - Home, http://statbel.fgov.be/nl/statistieken/cijfers/arbeid_leven/fisc/ (accessed 12.29.15).

Strauss, A.C., Corbin, J., 1998. Basics of Qualitative Research: Second Edition: Techniques and Procedures for Developing Grounded Theory, 2nd ed. Sage Publications.

van den Belt, M., Stevens, S.M., 2016. Transformative agenda, or lost in the translation? A review of top-cited articles in the first four years of Ecosystem Services. Ecosyst. Serv. 22, 60–72. https://doi.org/10.1016/j.ecoser.2016.09.006.

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Van Herzele, A., 2006. A forest for each city and town: Story lines in the policy debate for urban forests in Flanders. Urban Stud. 43, 673–696, https://doi.

Van Herzele, A., Van Gossum, P., 2008. Typology building for owner-specific policies and communications to advance forest conversion in small pine plantations. Landsc. Urban Plan. 87, 201–209, https://doi.org/doi:10.1016/j.landurbplan.2008.06.003.

Willcock, S., Hooftman, D., Sitas, N., O'Farrell, P., Hudson, M.D., Reyers, B., Eigenbrod, F., Bullock, J.M., 2016. Do ecosystem service maps and models meet stakeholders' needs? A preliminary survey across sub-Saharan Africa. Ecosyst. Serv. 18, 110–117. https://doi.org/10.1016/j.ecoser.2016.02.038.

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