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How methods influence nature's values we find – A comparison of three elicitation methods

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ABSTRACT

Recent research has called for eliciting plural values of nature, yet little is known on how the choice of methods impacts the different values elicited. Drawing on the notion of methods as value-articulating institutions and using grasslands restoration as a case study, we explored how different elicitation methods influence people's value expressions towards grasslands. We did so in three different ways: (i) comparing values between elicitation methods (i.e., open-ended questions, Likert-Scale survey, rating exercise), (ii) comparing common discourses that emerged using multivariate statistics (i.e. multiple correspondence analysis (MCA) and principal component analysis (PCA), and (iii) tracing how interviewees' expressed discourses varied between methods. Our results showed that different elicitation methods not only elicited distinct values and discourses but also influenced the discourse that respondents endorsed during the same interview. These findings demonstrate that elicitation methods act as value-articulating institutions by defining which values could be expressed and how. While the Likert-Scale and rating exercise strongly framed and limited which values could be expressed by respondents, the open-ended questions loosely outlined and guided value expression. This study posits that values can only be understood in light of the methods used to elicit them and further, that using only one method for the elicitation of plural values might lead to neglecting or overlooking of particular values because of the methods conduciveness to eliciting or articulating them. Thus, plural valuation necessarily requires the application of multiple, complementary methods to unleash its full potential to elicit plural values.

1. Introduction

The application of the famous reflection by Aldous Huxley "the means employed determine the nature of the ends produced" to the field of nature valuation entails that the means used to elicit values might impact the values elicited or, in other words, the elicitation methods may be as relevant as the valuation results themselves (Martín-López et al., 2014; Jacobs et al., 2018). Helmed by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (Díaz et al., 2015; IPBES, 2022), plural values of nature are becoming more prominent in conservation practices (Pascual et al., 2023; Pörtner et al., 2021; Riechers et al., 2022). As a result, efforts have been made to elicit those plural values of nature and their implications for conservation, restoration, and land management (Ghijselinck et al., 2023; López de la Lama et al., 2024; Riechers et al., 2020, 2022; Topp et al., 2022). Although plural valuation is considered critical to lever transformative change, little empirical research has so far focused on understanding the implications of the choice of methods for eliciting plural values (Pascual et al., 2023).

Vatn (2009) raised the idea that methods act as value-articulating institutions since the valuation process can strongly determine the values to be elicited ('created'). Value-articulating institutions are defined as structures that enable (or hinder) the expression of values and interests (Jacobs, 1997 cited in Vatn, 2015, p. 264), and how they are expressed (Anderson et al., 2022). Value-articulating institutions thus shape the conclusions and policy recommendations that can be reached

(Helseth et al., 2023). While some empirical research has explored the influence of the institutional context as policies and markets in shaping the boundaries of the valuation exercise (e.g. Helseth et al., 2023; Rico García-Amado et al., 2013), a deep understanding of the role of methods as value-articulating institutions is still missing.

Recent acknowledgement by the IPBES Values Assessment (IPBES, 2022; Pascual et al., 2023) has highlighted that the process of eliciting values is inherently influenced by the frameworks and methods employed. Valuation methods are based on a set of rules defining the valuation process. This includes who participates and how, what counts as data, and how data is produced and analysed. Thus, valuation methods act as value-articulating institutions (IPBES, 2022). The choice of the valuation method is guided by the institutional context since valuators and scientists are affected by their surroundings (Vatn, 2005, 2009). It can impact the results (Vatn, 2009) and, thus, the types of values brought into account when designing conservation, restoration, and land management practices (Martin et al., 2022). Therefore, we need a concerted effort to employ multiple valuation approaches that elicit the diverse values of nature (Jacobs et al., 2018; Termansen et al., 2022).

In this study, we used the IPBES values typology that classifies values into intrinsic, instrumental, and relational (Díaz et al., 2015; IPBES, 2022; Pascual et al., 2017). While intrinsic values refer to nature's inherent value, where nature is viewed as an end in itself, instrumental values refer to the value of nature as a means to the desired end of satisfying people's interests and needs (Arias-Arévalo et al., 2018; Deplazes-Zemp and Chapman, 2021; Pascual et al., 2017). Intrinsic and instrumental values are readily understood as they have been much used and discussed in the context of conservation over the past decades (Himes et al., 2024). Relational values are a relatively novel lens to soften the tension derived from the intrinsic vs. instrumental dichotomic narratives by exploring the range of desired and meaningful relations between people and nature and among people mediated through nature (Chan et al., 2016; Deplazes-Zemp and Chapman, 2021; Himes and Muraca, 2018). Broadly, relational values are understood as "preferences, principles, and virtues associated with relationships" (Chan et al., 2016, p. 1462) and encompass the notions of individual and cultural identity, sense of place, social cohesion, aesthetic and sacred values, as well as care, stewardship, and responsibility towards nature (Chan et al., 2016; Deplazes-Zemp and Chapman, 2021; Pratson et al., 2023). While much research has focussed on instrumental, intrinsic, and relational values and their plurality of motivations for sustainability, the implication of methods on their elicitation remains under-researched.

To address this research gap, this study seeks to investigate the implications of method choices for eliciting plural values. We examine the role of elicitation methods as value-articulating institutions and explore how different methods produce different results. The aim of this study is to compare the elicited values and value discourses, that is, the narratives that emerge around the simultaneous expression of values, related to grasslands that emerged from three different valuation methods based on open-ended questions, a Likert-Scale survey, and a ranking and rating exercise. Further, we sought to explore how these differences manifest in the discourses expressed by the participants of a transdisciplinary process within a restoration project of grasslands in Northern Germany on which this study draws. Our investigation is one of the first empirical studies to provide insights into the body of knowledge of plural valuation by shedding light on how data collection methods may act as value-articulating institutions.

2. Methodological approach

Our analysis was based on 39 interviews with people who actively participate in grassland management or restoration in Gifhorn, Northern Germany. We designed the interviews to elicit the interviewees' values for grasslands and their relationships with grasslands in the region. Interviews were structured in three blocks: (1) open-ended questions about the importance of grasslands for the interviewees, (2) a series of statements representing different values of grasslands followed by a 4-point Likert-Scale to assess agreement/disagreement, and (3) a ranking and rating exercise of the statements aimed to elicit a relative comparison of the interviewee's most agreed-with values. These three methods have been selected because they are common in social research assessing people's values towards nature (Newing, 2010) and, therefore, have been commonly used in plural valuation research (Pratson et al., 2023; Riechers et al., 2022). Furthermore, they cater well for comparison as they are individual-based elicitation methods producing data expressible in categories either by design or by content analysis (Newing, 2010).

2.1. Case study: restoration of grasslands in Northern Germany

We studied the values of grasslands of the district of Gifhorn, located in Lower Saxony, Northern Germany. The district of Gifhorn has a history in public and private grassland restoration projects (e.g. the restoration of the Ise river lowlands), as well as large areas falling under various protection statuses (e.g. the wet grasslands landscape of "Nördlicher Drömling" or the moorland landscape of "Großes Moor bei Gifhorn") (Fig. 1), which has resulted in a range of public-private governance mechanisms for extensive use of grasslands attempting to conserve species-richness. Gifhorn presents a typical northern German landscape mosaic of arable lands, grasslands, wetlands and floodplains, and mixed forests. The district has 17,838 ha of grasslands (11.4 % of the district area), of which 9446 ha (53 %) are under protection or use restrictions through locally and regionally protected areas (Naturschutzgebiete (NSG) and Landschaftsschutzgebiete (LSG)) (6.0 %) (Fig. 1). The conservation and restoration of grasslands has become essential due to the major threats they are facing, including the lack of profitability and competition with other agricultural uses, such as arable land, and the incipient demand for land for the development of projects related to renewable energy.

2.2. Recruitment of participants

We identified participants not only for this study but for the larger, transdisciplinary project of Grassworks (https://grassworksprojekt.de/en/; Temperton et al., 2025). We used pre-existing grassland restoration-related contacts from the region as a starting point to identify potential participants. To recruit further participants, we applied the snowball sampling technique through which interviewees suggested potential new participants who have been involved in grasslands restoration in the region. We stopped recruiting new participants when

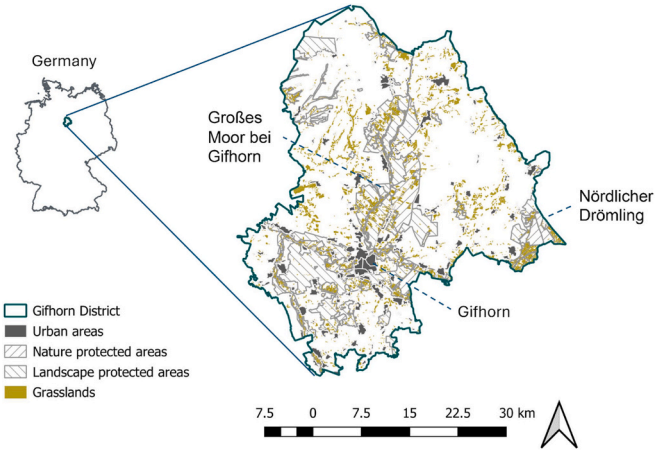

Fig. 1. The case study, Gifhorn county, is located in Northern Germany in the federal state of Lower Saxony. The protected areas of "Nördlicher Drömling" and the moorland landscape of "Großes Moor bei Gifhorn" are indicated.

we reached information saturation, defined as the stage where conducting new interviews yields minimal new information (Newing, 2010). After 39 interviews, the new data collected did not contribute with more insights about values or new people, which means we reached saturation. The final sample comprised nine women and 30 men, with an average age of 48 years (SD = 13). Most interviewees ($n = 31$, 79.5 %) lived in the study region, while 20.5 % ($n = 8$) of participants lived in adjacent municipalities. Interviewees included farmers and consultants, representatives of conservation agencies or NGOs, and political actors.

The lead author conducted 34 semi-structured face-to-face interviews and an additional five interviews via Zoom. All interviews were conducted in German, the native language of all interviewees. Interviews lasted between 18 and 56 min. All interviews were audio-recorded after the interviewee's consent, which was obtained in written form for face-to-face interviews and via audio recording for online interviews. Human research ethics clearance was obtained from the Ethical Review Board of Leuphana University.

2.3. Interview design

We structured the interview guide into four sections: (1) ice-breaking questions on the interviewees' involvement in restoration projects of grasslands; (2) questions to elicit the values of grasslands, including several open-ended questions, a Likert-Scale exercise to assess the level of agreement/disagreement with 22 statements representing different values, and a ranking and rating exercise of these statements; (3) questions on the collaborative relationships in the framing of grassland restoration and management; and (4) socio-demographic characteristics (see Text A1 and A2 in the Appendix for the interview guide in English and German). We pre-tested the interview guide outside of the case study and adapted it to enhance its effectiveness. We deliberately ordered the elicitation methods this way to minimize bias in the interviewees´ responses. The goal was to introduce the broad outline of grassland restoration and the Grassworks project while guiding interviewees´ reflections and eliciting values through open-ended questions. Varying the order of elicitation methods (e.g. starting with the Likert-Scale exercise) could have biased responses by exposing interviewees to concepts and value expressions previously identified by us. By starting with open-ended questions, interviewees were able to freely express values, ensuring that all values shared stemmed purely from their own (albeit guided) reflection. The introduction of values previously identified through research had to come after the free and untampered reflection of the interviewees.

Our open-ended questions entailed four prompts to understand interviewees' connections to and values for grasslands: (1) What is your connection or relationship with grasslands in the region?; (2) What do you value about grasslands in the region? Why?; (3) What do the local grasslands contribute to your well-being?; and (4); Would you say that the restoration of species-rich grassland is important? Why? In cases where respondents did not comprehend the questions or when answers were insufficient, we asked additional elaborating questions.

The open-ended questions were followed by 22 statements about the values of grasslands (randomized across value categories to avoid bias), aiming to provide a level of standardization in the valuation exercise. Interviewees assessed each statement at a time and provided their level of agreement based on a 4-point Likert-Scale that ranged from “strongly disagree” to “strongly agree”. The statements comprised 3 intrinsic, 3 instrumental, and 16 relational values (Table A1). We created the value statements based on former empirical research using statements to elicit plural values of nature (e.g. Inglis and Pascual, 2023; Klain et al., 2017; Saito et al., 2022) and on the review of empirical research on plural valuation of nature by Riechers et al. (2022). We contextualized the statements to the local context of grassland ecosystems in Germany.

Finally, we used a ranking and rating exercise to provide insight into how interviewees prioritize or evaluate different value statements. In the ranking exercise, we first handed interviewees cut-outs of the value statements that they expressed strong agreement with during the Likert-Scale survey. Then, we asked interviewees to select the top five statements that mostly resonated with them and order them from the most to the least important value. To do so, we provided respondents with a printout displaying a template with the ranks of one through five, with rank one representing the most important value, and rank five the least important one (Fig. A1). We complemented the ranking exercise, with the rating exercises through which we asked interviewees to attribute scores to the ranked statements. To attribute the scores, we provided respondents with a total of 10 physical tokens/points to their selection (Fig. A1). The instructions for the distribution of tokens indicated that the tokens had to add up to a total of 10 points but otherwise, no distribution rules were introduced. Therefore, respondents were free to distribute all tokens to one value statement as well as distribute an equal number of tokens to all five statements. This exercise aimed at enhancing the quantitative data produced during the ranking exercises. While both methods produce quantitative data, ranking exercises produce ordinal data, whereas rating produces interval or ratio data (Bryman, 2012).

We are aware of common biases associated with the methods applied in this study and tried as best as possible to mediate their effects on the results of value elicitation. General and high agreement with large parts of surveys have been widely observed and explained through various biases. We contend to disfavour strong influences of biases in our results as we did see variations in responses and even wide disagreement with statements. However, we acknowledge that acquiescence biases could have influenced our results to some degree. Two common components of acquiescence bias are agreeableness and errors in survey response processes. Regarding agreeableness, we argue that, by allowing interviewees to freely express their values and preferences in the open-ended questions section of the interview, respondents would not have felt a strong need to confine themselves to social norms of agreement as they had already positioned themselves in the interview. Regarding potential errors in survey responses, we argue that by asking question-by-question rather than presenting all and allowing interviewees to consider and weigh between all statements, we shortened the cognitive response time and potentially the errors. Yet, this may have introduced an anchoring bias where respondents responded with a “strongly agree” to an early statement so that a margin of weighing was minimized thereafter.

2.4. Data analysis

The answers from open-ended questions were transcribed using Trint, an AI-based transcription software, followed up by manual correction of transcription errors. We imported the transcripts into MAXQDA2022 for content analysis. We followed an iterative process of coding, engaging in both inductive and deductive approaches, by which we coded the interviews following the classification of values defined by Arias-Arévalo et al. (2018) and Riechers et al. (2022) and we allowed new codes to emerge (i.e., connectedness with nature). Table 1 defines the final list of value categories identified in this study. Finally, not all values from the Arias-Arévalo et al. (2018) and Riechers et al. (2022) were found through content analysis, yet as the value categories inspired the statements of the Likert-Scale survey and ranking and rating exercises, they are defined in Table 1. We coded 16 categories of relational values and one category for instrumental and intrinsic values, respectively (Table A1). From the content analysis of the open-ended questions, we created a dataset in which observations represented interviewees and variables represented the 18 categories of values, coded as ‘1’ (presence of the value in an interviewee's transcript) and ‘0’ (otherwise). This data format was chosen because it allows to compare the outputs from open-ended questions with the data from the Likert Scale survey and ranking and rating exercises.

To test whether methods act as value-articulating institutions, we compared the results from the different methods in three steps (Fig. 2):

Table 1
List of values and their description as used in this study. The list is largely derived from Arias-Arévalo et al. (2018) and Riechers et al. (2022) but original references as identified by the two studies are highlighted here. Additional, explanatory materials in form of verbatims from the open-ended questions section and the used value statements from the Likert-Scale survey can be found in the Appendix Tables A1 and A2.

Value categories	Investigated/ identified by method	Description	References
Instrumental	Open-ended questions Likert-Scale survey Rating exercise	Value of nature as utility and means to the desired end of satisfying people's interests and needs.	Arias-Arévalo et al. (2018) Pascual et al. (2017)
Intrinsic	Open-ended questions Likert-Scale survey Rating exercise	Nature's inherent value, where nature is viewed as an end in itself.	Arias-Arévalo et al. (2018) Pascual et al. (2017)
Cultural Identity	Likert-Scale survey Rating exercise	Identities of local cultures interlinked with and mediated by nature. This may also pertain to shared values within a given culture.	Riechers et al. (2022)
Individual Identity	Open-ended questions Likert-Scale survey Rating exercise	Personal identities interlinked with nature. This can for instance be linked to people's understanding of Self in Nature.	Schultz (2002) Schultz (2001)
Cognitive Development	Open-ended questions Likert-Scale survey Rating exercise	Appreciation of ecosystems' features within special educational and scientific interest or appreciation of learning something about oneself such as gaining perspective about life.	Arias-Arévalo et al. (2018) Schmitt et al. (2022)
Collective Identity	Likert-Scale survey Rating exercise	People's identification in terms of their (social or collective) group memberships.	Brieger (2019)
Heritage	Open-ended questions Likert-Scale survey Rating exercise	Nature's or a landscape's tangible or intangible features that hold historical or cultural significance.	Arias-Arévalo et al. (2018)
Cultural Continuity/ Traditions	Open-ended questions Likert-Scale survey Rating exercise	Beliefs, customs, or ways of doing something interlinked with nature that has existed for a long time among a particular group of people, social groups or culture.	Riechers et al. (2022)
Altruism	Open-ended questions Likert-Scale survey Rating exercise	A concern for biodiversity, ecosystems, or ecosystem services in favour of a present larger community of (future) generations.	Arias-Arévalo et al. (2018) Schmitt et al. (2022)
Social Relations	Open-ended questions Likert-Scale survey Rating exercise	Connections with other people as well as meaningful connections between social groups interlinked with nature.	Riechers et al. (2022)
Sense of Place	Open-ended questions Likert-Scale survey Rating exercise	Emotional attachment to a specific location, region, or place in or related to nature, often characterized as "home".	Arias-Arévalo et al. (2018) Gould et al. (2014) Plieninger et al. (2013)
Care/ Stewardship (eudaimonic)	Likert-Scale survey Rating exercise	Caring for and stewarding nature, reflecting the belief that "taking care of nature is the right thing to do" and "taking care of nature is necessary for a good life". These values vary across societies and cultures and are linked to the actions, behaviours and decisions of those who steward nature.	Bennett et al. (2018) Chan et al. (2016) Chapin et al. (2010)
Care	Open-ended questions		
Social Responsibility	Open-ended questions Likert-Scale survey Rating exercise	Acting in the best interest of nature and the individuals, social groups and/or cultures connected to it, including protecting nature for humanity. This involves relational responsibilities to nature, described as "an ontological other which projects its own rights", bridging ecophilosophical ontologies and blurring the lines with intrinsic values.	Bignall et al. (2016)
Aesthetics	Open-ended questions Likert-Scale survey Rating exercise	Appreciation of the beauty of nature's sights, smells, and soundscapes, grounded on sensations and emotions.	Arias-Arévalo et al. (2018)
Inspiration	Open-ended questions Likert-Scale survey Rating exercise	Appreciation of the inspirational value of nature and its features that causes exciting new ideas or the feeling of wanting to create something artistically.	Arias-Arévalo et al. (2018)
Therapeutic	Open-ended questions Likert-Scale survey Rating exercise	Perception of nature's function to improve mental health, offer spaces for quietness and retreat to reduce symptoms of anxiety, depression and improved social functioning. It also includes nature's ability to facilitate solitude, relaxation, as stress-relief, create distance to technology, and emotional and/or spiritual healing.	Harris (2017)
Relaxation	Likert-Scale survey Rating exercise		
Connectedness with nature	Open-ended questions	Feeling connected with nature and appreciating social-ecological dynamics, feedback, or interactions.	Riechers et al. (2022)
Conviviality	Open-ended questions	An appreciation of long-lasting co-occurrence with non-humans. It refers to individual and social freedom realized in the interdependence between humans and non-human natural entities.	Büscher and Fletcher (2019) Turnhout et al. (2013)
Meaningful occupation	Open-ended questions	Occupations related to biodiversity and ecosystems that allow people to fulfil a good human life.	Arias-Arévalo et al. (2018) Schmitt et al. (2022)

(continued on next page)

Table 1 (*continued*)

Value categories	Investigated/ identified by method	Description	References
Social cohesion	Open-ended questions	A connectedness, solidarity, and equity among people in and through nature. This can refer to a feeling of connectedness to a specific community mediated by nature and to shared values within a community through the relationships among members mediated by nature within the community itself.	Riechers et al. (2022)

(1) visually examining the average importance of values through scatter plots, (2) unravelling the different discourses of values of grasslands emerging from the different methods by applying multivariate statistics, and (3) exploring to what extent respondents changed their discourse when using different methods to collect the data.

Step 1: We visually examined in scatter plots the elicitation of each value by the three methods based on three indicators: (1) percentage of mentions of each value in the open-ended questions (Mentions (%)), (2) percentage of agreement reported with the Likert-Scale (Agreement (%)), and (3) the average of attributed points for each value as result of the rating survey (Average points). Due to the strong correlation between the ranking and rating exercises (Spearman's rank correlation: $\rho = 0.99$; $p < 0.0001$), we only considered for further analysis the weights given in the rating exercise by the interviewees. Thus, hereafter, we refer to the ranking and rating exercise simply as rating exercise. To calculate the first indicator (Mentions (%)), we constructed a matrix (i.e. 39 interviewees × 18 variables (values)), where '1' indicated that the specific value was coded within an interview transcript and '0' otherwise. To calculate the second indicator (% agreement), we transformed the 4-point-Likert-Scale of the value statements to binary variables, whereby '1' represents overall agreement with the value statement ('4 = strongly agree' or '3 = agree') and '0' represents overall disagreement ('2' = disagree' or '1 = strongly disagree').

Step 2: To identify the value discourses of grasslands that emerged from the different methods, we conducted multivariate statistical ordination techniques: Multiple Correspondence Analysis (MCA) for the dichotomous data resulted from the open-ended questions and Principal Component Analyses (PCA) for the quantitative data resulted from the Likert-Scale survey and rating exercise. We performed MCA and PCA to explore the relationships between different values that emerged from each valuation method, and that corresponded to different discourses around the value of grasslands. Since MCA and PCA belong to the same family of methods as both use decomposition techniques to reduce dimensionality of complex data while maximize the variance of the data, it favours the comparability of their outputs (i.e., discourses). MCA and PCA are counterparts for dichotomous and continuous data analysis and thus, bode well for this comparison (Grimsrud et al., 2020; Quintas-Soriano et al., 2023).

Step 3: To increase the applicability of the results of Step 2, we chose to highlight only those discourses that a representative group of interviewees resonated with. Thus, we identified for each interviewee for each elicitation method, the discourse that their responses match best with. Standard coordinates in MCA and squared cosines for PCA indicate the relative degree to which observations (interviewees) match the respective factors. Hence, the higher the standard coordinates in the MCA and the higher the squared cosines in the PCAs, the higher likelihood of each observation (interviewee) to have selected the discourse represented by the factor scores. This resulted in a condensed list of only those factors which resonate with a representative number of interviewees ($n > 1$). This allowed a comparison of meaningful discourses between elicitation methods. Further, this allowed a comparison of discourses for each interviewee between the different elicitation methods. By tracing how the discourses changed across elicitation methods per interviewee, we created a network graph that depicted overall discourse changes.

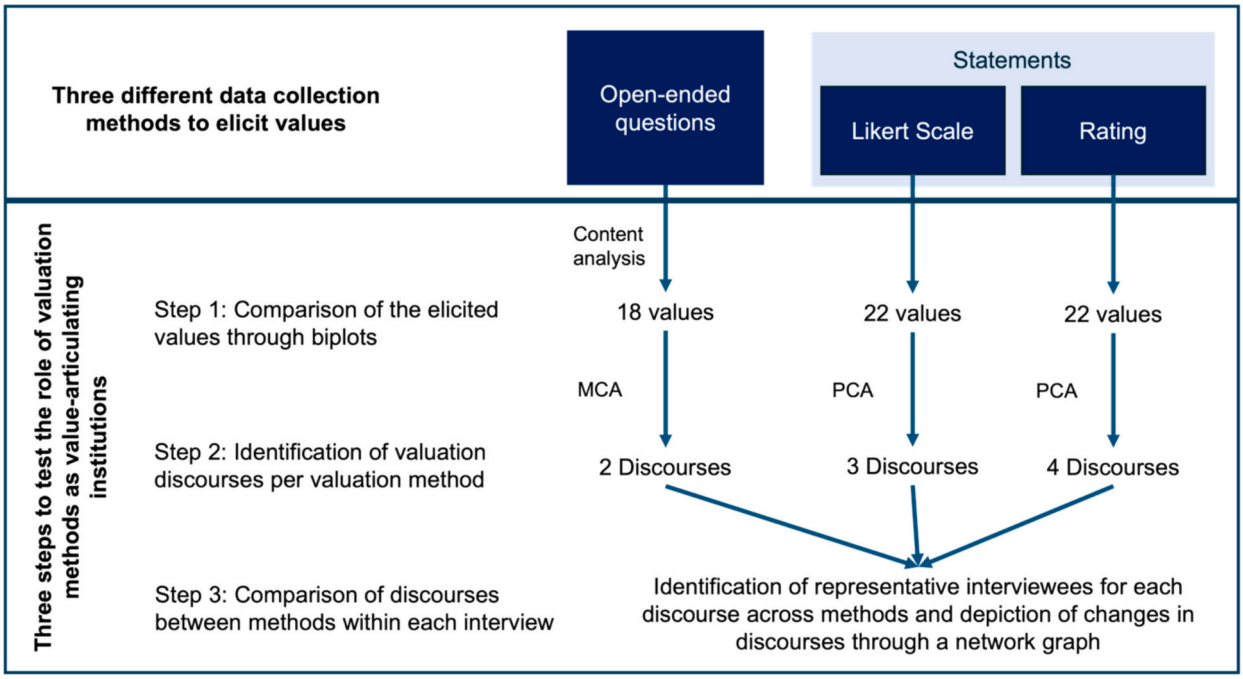

Fig. 2. Methodological approach used to empirically test whether valuation methods act as value-articulating institutions based on three steps: (1) comparison of the elicited values through biplots, (2) identification of valuation discourses, and (3) comparison of the discourses for each interviewee. MCA: Multiple Correspondence Analysis; PCA: Principal Correspondence Analysis.

3. Results

In the first step, we identified 18 values through content analysis (Table A2), that were compared with the values elicited through Likert-Scale survey and rating exercise. Instrumental, intrinsic, and the relational value *aesthetic values* were frequently elicited by all three valuation methods (Fig. 3a, quadrant top-right; Fig. 3b, quadrant top-right), while the relational values of *social relations* and *cognitive development* were identified sparsely in all methods alike (Fig. 3a, quadrant bottom-left; Fig. 3b, quadrant bottom-left). Moreover, we found that the relational value of *individual identity* was only frequently elicited through the open-ended questions (Fig. 3a, quadrant bottom-right). By contrast, most of the other relational values (*inspiration, sense of place, altruism, cultural continuity and traditions, cultural heritage, and therapeutic values*) were neither frequently elicited through the open-ended questions nor consistently identified as the most important values by the rating exercise (Fig. 3a, quadrant top-left; Fig. 3b, quadrant top-left). Finally, the relational value of *social responsibility* was highly agreed with and consistently attributed much value in the Likert-Scale survey and rating exercise, respectively, while was expressed rarely by the open-ended questions (Fig. 3b, quadrant top-right).

In the second step, we identified the discourses that emerged from the MCA and PCAs (Table 3). The MCA of the data from open-ended questions (OE) revealed that two factors explained 63.99 % of the variance (Table 2). Factor 1 (OE-F1; 48.02 % of variance) consisted of ten relational values in its positive scores and the aesthetic value in its negative scores. Therefore, Factor 1 hinted towards two discourses: *Deep Relatedness* (positive scores), which was expressed by seven interviewees (based on the standard coordinates), and *Aesthetics* of grasslands (negative scores), which was expressed by five respondents. Factor 2 (OE-F2; 15.98 %) displayed instrumental values and the relational value of cultural continuity in its positive scores, and the therapeutic value in its negative scores. Based on the positive scores of OE-F2, we found a third discourse, *Cultural Landuse* (positive scores), which was expressed by nine interviewees. Only one interviewee had high factor standardized scores for the OE-F2 negative scores, revealing that a potential discourse on therapeutic values was not relevant for further analyses.

The PCA for the Likert-Scale survey (LS) identified three factors explaining an accumulated variance of 60.85 % (Table 2). Factor 1 (LS-F1; 42.58 %) consisted of 12 relational values and three instrumental values in its positive scores. Factor 1 (positive scores) revealed a combined discourse of *Broad Valuation*, which was expressed by 12 interviewees (based on the squared cosines). Factor 2 (LS-F2; 9.97 %) displayed the instrumental value of economic benefits in its positive score and the relational values of sense of place in its negative score. Based on the negative scores of LS-F2, we identified a discourse emphasizing a *Sense of Place*, which was expressed by three interviewees. We did not find any interviewee strongly associated with LS-F2 positive scores. Factor 3 (LS-F3; 8.3 %) displayed *Intrinsic* values in its positive scores, which was highlighted by two interviewees.

The PCA for the rating exercise (RR) revealed four factors explaining 56.84 % of variance (Table 2). Factor 1 (R-F1; 17.81 %) consisted of the relational values of cultural heritage and relaxation in its positive scores. Negative scores of R-F1 consisted of instrumental values for material and regulating nature's contributions to people (NCP). Thus, RR-F1 revealed two discourses: (1) *Culture and Relaxation* (positive scores), which was expressed by four interviewees (based on the squared cosines), and (2) *Material and Regulating NCP* (negative scores), which was highlighted by five interviewees. Factor 2 (R-F2; 15.09 %) revealed a combination of intrinsic values and the relational value of social responsibility in its positive scores. Its negative scores displayed a combination of instrumental values for economic benefits and the relational value of aesthetics. R-F2 identified two discourses: (3) *Wardship* (positive scores), emphasized by five interviewees, and (4) *Utilization* (negative scores), which was endorsed by four interviewees. Factor 3 (R-F3; 13.24 %) displayed *Intrinsic* values in its positive scores, revealing a discourse with which three interviewees identified. Factor 4 (RR-F4; 10.7 %) consisted of the relational value of *Sense of Place* in its positive scores, revealing a discourse endorsed by three interviewees.

In the third step and to detect the impact of methods as value-articulating institutions, we explored whether the same interviewee kept the discourse or changed it according to the valuation method used. Using the larger standard coordinates and the larger squared cosines of the observations (i.e. interviewees) for each factor of the MCA and PCA, respectively, we matched our interviewees to the identified discourses that best described them. For the sake of comparability between

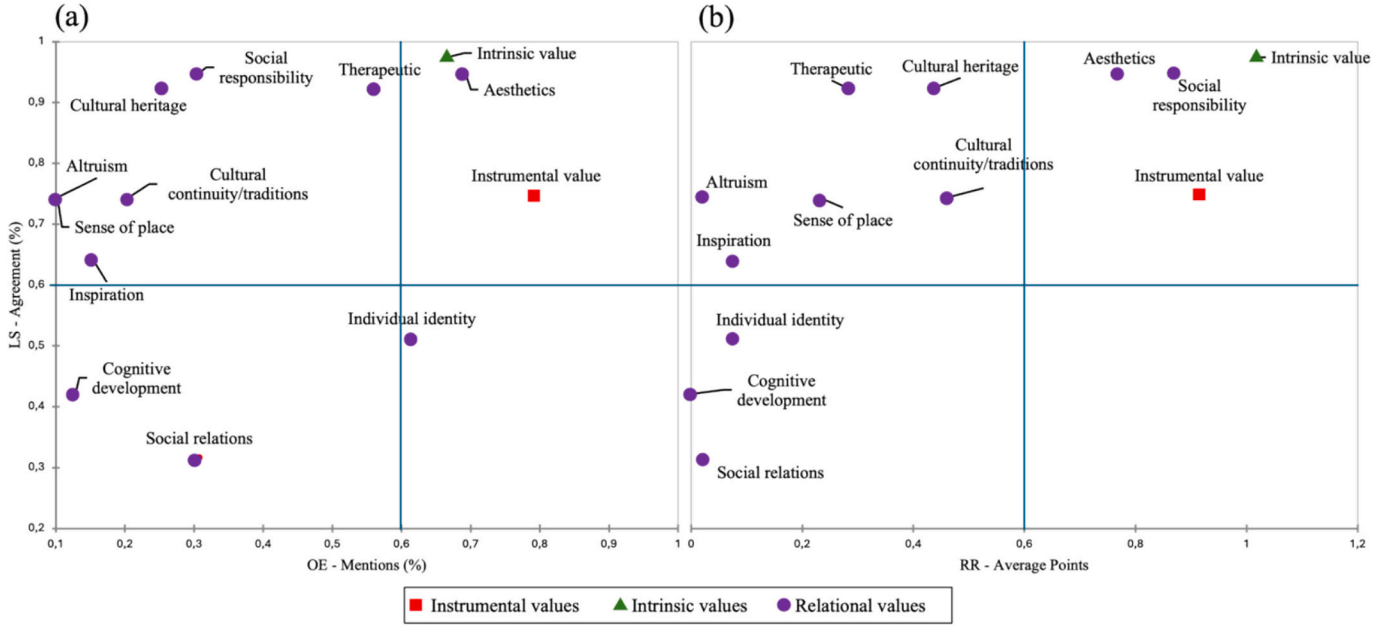

Fig. 3. (a) Scatter plot visually comparing the elicited values through the content analysis of open-ended questions (x-axis) and the Likert-Scale survey with values statements (y-axis). (b) Scatter plot visually comparing the elicited values through the rating exercise assessing the agreement of value statements (x-axis) and the Likert-Scale survey assessing the agreement of values statements (y-axis). Only values that occurred in the three methods were plotted.

Table 2
Factor loadings derived from the Multiple Correspondence Analysis (MCA) from the open-ended question and Principal Component Analyses (PCAs) from the Likert-Scale survey and rating exercise. Values in bold correspond to those values for which the squared cosine is larger in each factor.

	Open-ended questions		Survey: Likert Scale			Survey: ranking & rating			
	F1	F2	F1	F2	F3	F1	F2	F3	F4
Instrumental values									
Regulating NCP	0.02	**0.06**	**0.60**	0.23	0.42	−0.49	0.27	0.15	0.17
Material NCP			**0.34**	−0.01	0.14	**−0.66**	−0.25	−0.37	0.05
Economic Benefits			**0.84**	**0.71**	−0.37	−0.34	**−0.64**	−0.26	−0.34
Intrinsic values									
Landscape	0.01	−0.03	0.17	−0.08	**0.20**	0.06	**0.74**	−0.10	−0.09
Species			0.01	−0.01	0.06	−0.04	0.04	**0.70**	0.09
Prosperity			0.23	−0.06	**0.44**	0.05	−0.07	**0.58**	−0.35
Relational values									
Traditions	#N/A	#N/A	**0.59**	−0.27	−0.27	0.45	0.19	−0.27	**−0.51**
Cultural continuity	0.12	**0.28**	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Cultural heritage	0.04	−0.16	**0.36**	−0.13	−0.20	**0.60**	0.26	−0.23	−0.38
Cultural identity	#N/A	#N/A	0.21	−0.17	0.12	−0.26	−0.03	0.54	−0.25
Collective identity	#N/A	#N/A	**0.52**	−0.20	−0.04	#N/A	#N/A	#N/A	#N/A
Social relations	**0.07**	−0.02	**0.58**	0.14	−0.17	#N/A	#N/A	#N/A	#N/A
Social responsibility	**0.22**	0.04	**0.28**	0.05	0.26	−0.46	**0.47**	−0.42	0.18
Care	**0.24**	0.02	**0.73**	0.24	0.24	#N/A	#N/A	#N/A	#N/A
Altruism	0.29	0.09	**0.45**	−0.13	0.38	#N/A	#N/A	#N/A	#N/A
Sense of Place I	**0.65**	−0.09	**0.69**	−0.18	−0.26	#N/A	#N/A	#N/A	#N/A
Sense of Place II			0.52	**−0.54**	0.01	0.28	0.07	0.06	**0.59**
Meaningful occupation	**0.22**	−0.07	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Conviviality	**0.43**	0.14	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Connectedness with nature	**0.27**	−0.14	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Individual identity	**0.11**	−0.06	**0.90**	0.20	0.08	#N/A	#N/A	#N/A	#N/A
Cognitive development	**0.38**	−0.01	**0.74**	−0.25	−0.09	#N/A	#N/A	#N/A	#N/A
Inspiration	**0.45**	−0.07	**0.58**	−0.12	−0.07	#N/A	#N/A	#N/A	#N/A
Therapeutic	−0.02	**−0.14**	0.39	−0.23	−0.01	#N/A	#N/A	#N/A	#N/A
Relaxation	#N/A	#N/A	**0.12**	−0.09	−0.16	**0.66**	−0.16	−0.01	0.46
Aesthetics	**−0.07**	−0.05	0.13	0.16	0.11	0.35	**−0.69**	−0.15	0.11
Variance explained									
Variance explained (%)	48.02	15.98	42.58	9.97	8.30	17.81	15.09	13.24	10.7
Cumulative variance (%)	48.02	63.99	42.58	52.55	60.85	17.81	32.90	46.14	56.84

discourses, we interpreted *Deep Relatedness* and *Broad Valuation* as the same discourse across open-ended questions and Likert-Scale survey because they shared several value types. Therefore, for the sake of tracing discourse changes, we refer to them as *Deep Relatedness*. While we did not see them as equal – the conceptions of what the plurality of values means and where it originates methodologically are quite different (see 4.1) – they were the richest and most diverse discourses associated with the highest valuation. It is important to note that while the positive scores of F1 of the PCA from the Likert-Scale survey represented those interviewees best described by the discourse of *Broad Valuation,* the negative scores represented those interviewees disagreeing with most value statements and thus leading to no distinct discourse. This we interpreted similar to low expressed valuation in the open-ended questions (i.e., *Aesthetics*). Based on that, we were able to identify discourses for all three elicitation methods for 20 interviewees, 18 interviewees were associated with discourses in two elicitation methods, and one interviewee matched only one identified discourse (Fig. A2).

We found that interviewees belonging to the discourse of *Aesthetics* remained and changed discourses to various discourses based on intrinsic, relational, and instrumental values (Fig. 4). Similarly, some interviewees with the discourse of *Deep Relatedness* kept the discourse throughout methods, but others changed to discourses dominated by intrinsic, relational, and instrumental values alike (Fig. 4). Eight interviewees expressed matching discourses (i.e., *Deep Relatedness* and *Aesthetics)*, nine interviewees changed discourses partially (i.e., from *Intrinsic* to *Wardship,* from *Deep Relatedness* to *Sense of Place,* from *Cultural Landuse* to *NCP*), and 17 interviewees changed discourses across methods (i.e., from *Cultural Landuse* to *Intrinsic,* from *Aesthetics* to *Intrinsic,* from *Deep Relatedness* to *Utilization*) (Fig. 4). We interpreted partial changes where interviewees matched with different discourses between methods highlighting values that overlapped partially (i.e., *Intrinsic* to *Wardship* where *Wardship* encompassed intrinsic values and relational values social responsibility). Complete changes were interpreted where interviewees matched at least two discourses that corresponded to no matching values at all (i.e., *Cultural Landuse* (encompassing instrumental values and relational values of cultural continuity) and *Intrinsic*). The strongest change in discourses was found between open-ended questions and the two survey-based methods. While some interviewees expressed rich discourses (i.e., *Deep Relatedness* and *Cultural Landuse*) in open-ended questions, their discourses narrowed in terms of diversity of values with the Likert-Scale survey (i.e. *Intrinsic, Aesthetics*) and the rating exercise (i.e., *Utilization, Wardship, NCP*) (Figs. 4, A2, Interviewees #3, #12, #36, #37, #38).

4. Discussion

The principal goal of this study was to contribute to the body of knowledge on plural valuation by shedding light on how methods act as value-articulating institutions. We did so by testing the role of methods as value-articulating institutions in three different ways. We (i) compared values between elicitation methods and (ii) common discourses constituted of co-occurrences of values, as well as (iii) tracing how interviewees' expressed discourses varied between methods. Based on the results of the three comparisons, we developed two rationales to explain the coherences and dissimilarities of some discourses and values between elicitation methods. We consider it plausible that (a) methods

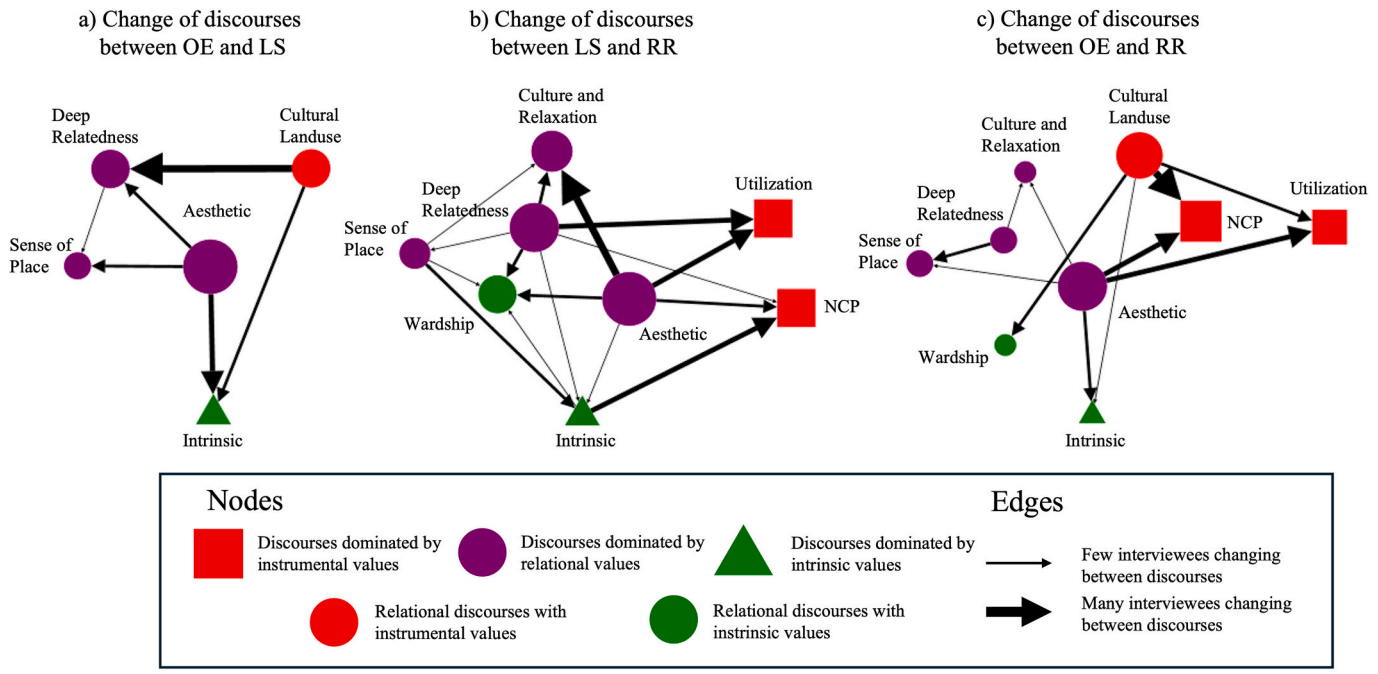

Fig. 4. Change of interviewees' discourses between methods: a) open-ended questions to Likert-scale survey; b) Likert-scale survey to ranking and rating exercise; c) open-ended questions to ranking and rating exercise. Nodes represent the identified discourses (see Table 3 and edges represent the changes of discourses between elicitation methods. Shapes and colours indicate dominant value types within discourses (i.e., red squares indicate discourses dominated by instrumental values, purple circles indicate discourses dominated by relational values, green triangles indicate discourses dominated by intrinsic values, red and green circles indicate relational discourses with instrumental or intrinsic values, respectively). The width of edges represents how many interviewees changed discourses between the two discourses. For additional information on discourses and their changes of interviewees see Fig. A2. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

acted as value-articulating institutions and led to distinct values and dissimilar discourses covering unique narratives and that (b) historical legacies and the institutional context of the interviews led to coherences in elicited values and discourses.

4.1. Influence of methods on the elicited values

To the authors knowledge, there is but one other study seeking to empirically compare how different valuation methods influence expressed values (Saarikoski et al., 2022). Yet, Saarikoski et al. (2022) focused on the value-articulating nature of methods that belong to different paradigms (i.e., individual-based monetary valuation, multi-criteria decision analysis, and deliberative settings). Our study is thus, to the best of our knowledge, the first one to investigate how elicitation methods within the same data collection method (i.e. an interview), act as value-articulating institutions eliciting different values and producing different discourses even in otherwise stable research paradigm. Three broadly applicable yet commonly compared value elicitation methods produced different values and value discourses across and within interviewees. They acted as value-articulating institutions as they might distinctly frame the mind-spaces of interviewees. They defined which values could be expressed and in what form. Specifically, open-ended questions acted as the boundaries and frames which merely guided interviewees in reflection towards the object of valuation, whereas the two survey-based methods strongly framed which values could be expressed and which ones are excluded. Below, we present two examples that show how the selection methods create boundaries and frames for the valuation exercise.

First, our results show that open-ended questions elicited relational values of personal identity more prominently than the survey-based methods, highlighting that standardized statements in this case, and possibly in general, are too rigid to capture and resonate with the broadness and fuzziness of some relational values (Fig. 3). Moreover, our results show that open-ended questions elicited broader discourses that comprised plural values, such as the discourse of *Deep Relatedness* (Table 3). For example, the quote "*For me, sustainable grassland management is what I have always dreamed of and I can do that here. […] This expanse and species-rich grassland has a completely different value. […] This is something […] that connects with my personality? […] That's the reason why I studied [this], because grassland is farmed and so you have to deal with agriculture. […] This combination of forest and grassland. And always in connection with extensive use, it is indeed also a cultural landscape.*" (Interviewee #39) highlights the complex, multifaceted valuing of grasslands. In none of the survey methods, personal narratives and interlinkages between values were elicited quite like in open-ended questions. Open-ended questions were uniquely suited to offer designed openness to interviewees to reflect on their relationships and freely express complex entanglement of values. This finding was strengthened by the results of comparing interviewees discourses between elicitation methods since the broader discourses of *Deep Relatedness* and *Cultural Landuse* only appeared in open-ended questions. Moreover, despite the discourses of *Deep Relatedness* and *Broad Valuation* sharing many values, the comprehensiveness of the *Deep Relatedness* discourse was possible due to the qualitative nature of the data. By contrast, the prewritten statements of the Likert-Scale survey, although allowing to broad agreement ultimately indicating strong values for grasslands, they lack of the in-depth meaning of grasslands for the interviewees.

Second, we found that the rating exercise mostly elicited instrumental and intrinsic values (Fig. 3) and related discourses (Table 3). The exemplary discourses of *Intrinsic* and *Wardship*, on one side, and *NCP*, on the other, closely mirror the traditional narratives and historical legacies (see 4.2) of the fields of conservation (Mace, 2014) and restoration (Hertog and Turnhout, 2018). We argue that the succession of steps of introducing 22 value statements and reducing them to a ranking of five might have created a cognitive framing that oversimplifies or overlooks

Table 3
Discourses derived from the Multiple Correspondence Analysis (MCA) of the data collected through open-ended questions and the Principal Correspondence Analyses (PCAs) of the data collected through the Likert-Scale survey and rating exercise. The table shows the connections between the factors from Table 2 and the relevant discourses derived from each factor of MCA and PCAs.

Method	Factor	Discourse	Description	Values
Open-ended Questions	F1 (−)	Aesthetics	This discourse revolves around the aesthetic beauty, the sights, the sounds, and smells of grasslands.	Aesthetic value
	F1 (+)	Deep Relatedness	This discourse connects valuing grasslands for their community-building aspects with emotional connections to nature and their importance for personal identities and development.	Social relations Social responsibility Care Sense of place Meaningful occupation Conviviality Connectedness with nature Individual identity Cognitive development Inspiration
	F2 (+)	Cultural Landuse	This discourse emphasizes cultural value of grasslands, which is inherently connected to their agricultural, instrumental value.	Instrumental value Cultural continuity
Survey: Likert Scale	F1 (+)	Broad Valuation	This discourse describes the generally high values connected to grasslands. Instrumental, cultural, social, emotional, and individual values appear all together in this broad discourse.	Instrumental value Traditions Cultural heritage Collective identity Social relations Social responsibility Care Altruism Sense of place Individual identity Cognitive development Inspiration Relaxation
	F2 (−)	Sense of Place	This discourse highlights how grasslands contribute to a sense of place or a sense of feeling at home.	Sense of place
	F3 (+)	Intrinsic	This discourse highlights the intrinsic values of grasslands.	Intrinsic value
Survey: Ranking & Rating	F1 (+)	Culture and Relaxation	This discourse reveals the calming and relaxing properties people experience when traversing grasslands as traditional and culturally rich landscapes.	Traditions Cultural heritage Relaxation
	F1 (−)	Material and Regulating NCPs	This discourse revolves around the material and regulating contributions to people grasslands provide.	Regulating NCP Material NCP
	F2 (+)	Wardship	This discourse revolves around a sense of responsibility to protect and restore grasslands for their inherent and intrinsic value.	Intrinsic value Social responsibility
	F2 (−)	Utilization	This discourse emphasizes the direct use-value of grasslands as a source of income and aesthetic enjoyment.	Economic benefits Aesthetic value
	F3 (+)	Intrinsic	This discourse highlights the intrinsic values of grasslands.	Intrinsic value
	F4 (+)	Sense of Place	This discourse highlights how grasslands contribute to a sense of place or a sense of feeling at home.	Sense of place

important nuances that can be expressed through the semi-structured dialog created by open-ended questions.

In addition, although we found a consistency of values between elicitation methods, these values were embedded in different discourses. While instrumental, intrinsic, and aesthetic values of nature were elicited reliably and strongly across all three methods, they occurred in distinct discourses across methods. For example, instrumental values co-occurred with the relational value of cultural continuity in the discourse of *Cultural Landuse* that emerged from the open-ended questions, whereas instrumental values comprised two different discourses in the rating exercise: *Material and Regulating NCP* and *Utilization* (Table 3). This difference can be explained by the different nature of the methods. While the openness of open-ended questions might allow personal narratives about the connection between culture and agricultural use to emerge - as expressed by the quote "Grasslands are cultural landscapes which have been and still are the result of extensive use" (Interviewee #39), rating exercises foster the discretization of values and, thus, prevent holistic discourses revolving around grasslands as cultural landscapes. Another relevant example of values embedded in different discourses due to the selection of method is the fact that the Likert-Scale method allowed a discourse comprised by several relational and instrumental values (i.e. *Broad Valuation* discourse) that was not found through the open-ended questions and rating exercise. Since the Likert-Scale allows participants to simultaneously agree with several values, it might lead to the most comprehensive recognition of values and social dimensions of grasslands, as a few interviewees stated at the end of the interview: "I thought it was a very nice interview, which raised my awareness of the grassland. If someone had asked me, I wouldn't have said that I have so much to do with grassland, because for me it's kind of a given. So thank you very much for asking me these interesting questions." (Interviewee #4) and "It was actually quite interesting to get into the social aspects of grassland, because for me as a conservationist, this plays a key role. I think there are many aspects to it that I have simply never thought about before. I think it broadens my horizons, and that I can perhaps rethink many questions that I now answer[ed] with a blanket 'no, I don't see it at all' because it's somehow traditional connections and things like that [now that] I've given it some thought." (Interviewee #37).

4.2. Influence of institutional legacies and context on values

Intrinsic and instrumental values have long served as the argumentative basis to suggest conservation and restoration practices (Hertog and Turnhout, 2018; Mace, 2014; Murali et al., 2024; Reyers and

Bennett, 2025). A long tradition of scholars in environmental philosophy have argued that values of nature, or what people find important, have underpinned the different strategies of conservation and restoration (Hertog and Turnhout, 2018; Hull et al., 2003; Reyers and Bennett, 2025; Stenmark, 2002). While not distinctly clear-cut, generally ecocentrism and biocentrism, based on the notion that all living beings have an intrinsic value, were the main ethical foundations of the first movements of biodiversity conservation in Western societies in the latter part of the 20th century, anthropocentric ethical foundations based on instrumental values conformed the main argument to conserve biodiversity in the first decade of the 21st century (Batavia and Nelson, 2017; Mace, 2014; Reyers and Bennett, 2025). Although intrinsic values were the main initial argument to protect biodiversity in Western societies, scholars and historians have also argued that the scenic beauty or aesthetic value of ecosystems was another important consideration (DiSilvestro, 1993; Noss and Cooperrider, 1994).

The historical dominance of narratives of biocentrism, anthropocentrism, and the value of nature's aesthetic beauty left a legacy in the practical fields of conservation (Mace, 2014) and restoration (Hertog and Turnhout, 2018) that seems to remain as the principal rationales of today's practitioners, as demonstrated by Murali et al. (2024) in the realm of conservation and by this study in the realm of restoration. It is important to note that we observed the influence of the historical legacies of biocentric and anthropocentric ethical foundations throughout the different elicitation approaches because instrumental, intrinsic, and aesthetic values of nature were the only values elicited by all three methods (Fig. 3). Interestingly, these values (i.e. instrumental, intrinsic, and aesthetic values) were also identified to be strongly associated with cultural grassland landscapes in other studies conducted in Central Europe (Riechers et al., 2021; Schmitt et al., 2022).

The institutional context of the interviews and the study itself further influenced the array of values to be found. The design of the stakeholder identification process may have been susceptible identifying people that tend to share values and worldviews. Since the overarching project, in which this study is embedded, focuses on the restoration of species-rich grasslands, the stakeholders targeted for interviews are specifically associated with protected or extensively managed grasslands. Thus, it needs to be acknowledged that the overwhelming coherence of recognition of instrumental, intrinsic, and aesthetic values may not necessarily be representative for the valuing of grasslands outside of this sample, composed by intensive and extensive farmers, environmental agencies and NGOs, and political actors. By contrast, it is expected that farmers that manage grasslands intensively might express less prominently intrinsic or aesthetic values (Fig. A2). Similarly, all interviewees were active stakeholders related to the restoration or management of species-rich grasslands, meaning that they are likely exposed to the historical legacies of the political debates and practices of restoration. People outside the restoration community may be less inclined to follow those historically dominant narratives and generally focus on personal and relational aspects of human-nature connections instead (Chan et al., 2016). In addition to the selection of interviewees, the processes of data collection and analysis are considered value-articulating institutions that span across the three elicitation methods (Vatn, 2005, 2009).

5. Conclusion

This study confirms the theoretical postulate that as value-articulating institutions, methods produce different results. To elicit values of grasslands, we used three different elicitation methods: open-ended questions, Likert-Scale survey, and a rating exercise. To test the hypothesis that methods act as value-articulating institutions, we used three approaches: (1) visually comparing specific values, (2) unravelling the different discourses emerging from the different elicitation methods, and (3) exploring to what extent respondents changed their discourse when using different elicitation methods. The results indicated that respondents not only expressed different values of grasslands when applying a different elicitation method (Fig. 3), but 43 % ($n = 17$) of the interviewees changed the discourse about the value of grasslands when using a different elicitation method (Fig. 4). Coming back to Aldous Huxley's famous phrase with which we open this paper, this might indicate that means (elicitation methods) and ends (elicited values) are mutually co-dependent and, therefore, the choice of methods is as important as the values that were elicited.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ecolecon.2025.108721.

CRediT authorship contribution statement

Lukas Kuhn: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Miguel Ángel Cebrián-Piqueras:** Writing – review & editing, Writing – original draft, Visualization. **Maraja Riechers:** Writing – review & editing, Methodology, Conceptualization. **Jacqueline Loos:** Writing – review & editing, Methodology, Conceptualization. **Berta Martín-López:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Project administration, Methodology, Formal analysis, 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

Data will be made available on request.

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