OXFORD

BioScience, 2023, **73**, 663–670
https://doi.org/10.1093/biosci/biad068
Advance access publication date: 6 September 2023
Forum

Value exclusion in social–scientific approaches for assessing and valuing ecosystem features: Implications for behavioral compliance

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Abstract

Value inclusion is critical for effective ecosystem science policy and largely emerged from critiques of the value-exclusionary attributes of ecological and economic approaches to value assessments and valuations. But whether and how value is excluded during social–scientific approaches to the assessments and valuations of ecosystem features has not received adequate attention. We identify and discuss instances of when and how value is excluded during social–scientific approaches to the assessments and valuations of ecosystem features to which people ascribe value. We illustrate the implications of value exclusion on social compliance with ecosystem management and policy recommendations, a vital overlooked aspect of policy effectiveness. We also extend the meaning of value exclusion beyond value omission to include misidentification and misattribution of salience to valued ecosystem features. We offer suggestions for enabling value inclusion where ways to minimize exclusion are inapparent.

Keywords: value exclusion, behavioral compliance, value assessment, valuation, policy effectiveness

There is a need to explore how value is excluded in social–scientific assessments and valuations of ecosystem features (e.g., species richness, timber, pollination, aesthetic beauty) to which people ascribe value. Exploring the implications of value exclusion for social compliance with ecosystem management and policy recommendations is equally important. Value exclusion involves leaving out some values in making decisions and managing ecosystems. For example, it may involve considering only biophysical (e.g., species richness or land cover) or monetary (e.g., market prices or contingent valuation) values in ecosystem decision-making and management. Also, value exclusion occurs when we fail to consider value priorities. Although both might be important to a particular group of people, species richness could be less important than land cover to that group. The significance of value exclusion cannot be overemphasized (Daily et al. 2000, Chan et al. 2012, Pascual et al. 2017). However, studies exploring value exclusion in social–scientific approaches to value assessments and valuations are rare. Most pertinently, the connections between value exclusion and behavioral compliance with ecosystem management decisions and policies are underexplored. Policies are ineffective without social compliance (Cialdini 2007).

Human values influence behaviors (Schwartz 1996, Fischer et al. 2011). More specifically, human values affect proenvironmental behaviors (Schultz et al. 2005). The values we ascribe to nature affect social compliance with environmental regulations (Ramcilovic-Suominen et al. 2013). Also, small policy changes informed by the behavioral sciences can lead to significant policy outcomes (Cialdini et al. 2015). So, the links between value exclusion and behavioral compliance with management and policy recommendations, as attributes of ecosystem policy effectiveness, are worth exploring.

Examining value exclusion is important because it helps us better understand and inform value inclusion, the process of eliciting and integrating a larger set of heterogeneous (monetary, economic, social, etc.) values and value priorities in decision-making. Value inclusion emerged largely from exploring how value is excluded in ecological and economic value assessments and valuations of biodiversity and ecosystem services. Scholars pointed to the exclusion of values ascribed to intangible ecosystem services (Chan et al. 2012, Darvill and Lindo 2015), particularly cultural (sociocultural) ecosystem services. Critiques of economic value assessments and valuations highlighted the exclusion of values that are not captured in the marketplace (Daily et al. 2000, Ruffo and Kareiva 2009). These critiques exposed two critical realities. First, ecological and economic scientific approaches are ill suited for assessing and valuing some ecosystem features. And the values of these ecosystem features can be estimated inaccurately, resulting in significant consequences for management and policy (Bockstael et al. 2000, Ruffo and Kareiva 2009). Therefore, examining value exclusion manifested through economic and ecological assessment, and valuation led to a better understanding of the importance of value inclusion in the interphase between ecosystem services and science policy. But examinations of value exclusion that occur in social–scientific (social or sociocultural)

Received: May 16, 2023. **Revised:** July 10, 2023. **Accepted:** July 12, 2023

assessments and valuations of biodiversity and ecosystem services are uncommon, albeit important.

Value inclusion is important in many other ways. It contributes to socially optimal decision-making and ecosystem management by facilitating the mitigation of distributional concerns of fairness, justice, and equity (Luck et al. 2012, Chaudhary et al. 2018, Primmer et al. 2018, Kolinjivadi et al. 2019). These distributional or equity-oriented parameters for decision-making often lead to perceptions of winners and losers (Laurans et al. 2013). Effectively addressing equity requires proper determination of winners and losers, which is hardly attainable without considering all relevant values in management and decision-making contexts. Value inclusion also enhances the legitimacy and, therefore, the social acceptability of decisions (Asah and Blahna 2020, Breyne et al. 2021).

Beyond distributional concerns, legitimacy, and social acceptability, there is a relatively understudied—and, therefore, underappreciated—benefit of value inclusion: It leads to behavioral compliance with ecosystem management and policy recommendations. Often, policies essentially constitute and regulate human behavior by defining who can do what and to what extent to attain objectives (Asah et al. 2014). For example, only those who have purchased a visitors' permit can visit some parks, and you can spend only a day at a park if you purchase a day pass. Behavioral compliance is a precondition for policy effectiveness; policies are only effective to the extent that people comply with their constitutive and regulatory prescriptions (Cialdini 2007). Therefore, management and policy decision-making processes benefit from considering the conditions for and the likelihood of people acting in conformity with policy recommendations (Cialdini 2007, Sverdlik and Oreg 2009).

It is essential to also consider priorities in value inclusion. People often resist actions aimed at attaining goals that are incongruent with their values or that are of a lesser priority than the values attainable by defying policy recommendations (Schwartz 1996). Therefore, people behave not only because behaviors are consistent with their values but also because those actions are congruent with their value priorities (Devos et al. 2002, Fischer 2012). Therefore, behavioral compliance with policies concerning ecosystem services is about congruence with values and value priorities, accurate value prioritization is important for policy effectiveness, and exclusion extends beyond value omission to include inaccurate value prioritization.

Value inclusion is likelier when decision-makers and managers are aware of the multiplicity of values and value priorities that are at play in the decision-making context. Such awareness is largely acquired from empirical identification of valued ecosystem features and estimations of the extent to which each of those features is valuable. Consequently, empirical assessments and valuations of valued ecosystem features must precede value inclusion. Most recently, attention to value exclusion has been concerned with the exclusion of alternative theoretical conceptualizations of value and the resultant extensions of value typologies—instrumental, intrinsic, and relational values of ecosystem features (e.g., Chan et al. 2016, Chan et al. 2018, Ishihara 2018, Raymond et al. 2018, Stenseke 2018). These contributions enrich our understanding of value exclusion and further highlight the need for value inclusion. Functionally, value typologies and conceptualizations do not exist in a vacuum. They are associated with or ascribed to tangible and intangible ecosystem features. When such features are omitted in assessments, so are the values ascribed to them. Therefore, beyond the utility of theory, typology, and conceptualization, the need arises to examine how and when value is excluded during actual social–scientific assessments and valuations of ecosystem features to which people ascribe value.

Social–scientific value assessments and valuations of ecosystem features are essentially methodological. Social value assessments are often conducted using qualitative and deliberative techniques such as interviews and participatory mapping (e.g., Villegas-Palacio et al. 2016, Boeraeve et al. 2018, Scully Engelmeyer et al. 2021). A variety of quantitative methods, of which the Likert-type psychometric scale is most prominent, are used to conduct social valuations (Maestre-Andrés et al. 2016, Malinauskaite et al. 2021). Three considerations are important for examining how and when value is excluded in these social–scientific assessments and valuations. First, social value assessments are the socioscientific processes and mechanisms for identifying ecosystem features to which people ascribe value. Second, social (or sociocultural) valuation is the social–scientific determination of the extents to which various ecosystem features are important to people—valuations based on the view that nature is important for human life (Costanza et al. 1997, Daily 1997, Costanza 2000). Third, the application of social–scientific approaches to assessing ecosystem features should precede social–scientific methods for the valuation of those features; we must first identify valuable ecosystem features before we can estimate the extent to which those features are important to stakeholders (Raymond et al. 2014). Value exclusion can occur during social–scientific modes of assessments—omission or misidentification of valued ecosystem features—as well as during social–scientific approaches to valuations—inaccurate value estimation (misattribution of salience) and consequent prioritization.

Our main goal was to identify and describe instances of value exclusion and to explore the implications of such exclusions on behavioral compliance with management and policy recommendations. We used two Boolean operators in the Google Scholar database to identify those instances. For value assessments, we used the following operator: *"ecosystem services" AND ("social values" OR "socio-cultural values")*. We used *"ecosystem services" AND ("social valuation" OR "socio-cultural valuation")* for literature on social valuations. We restricted our search to the last two decades (2000–2023). These operations uncovered thousands (approximately 17,000 for values assessments and approximately 1800 for social valuations) of articles. Our main goal was to identify evidence of value inclusion not its systematic bibliometric representation in the literature. So, we stopped selecting articles after identifying seven major value exclusion categories to enable exploration of their implications for behavioral compliance with management and policy recommendations. In the following sections, those different categories are labeled, cited, and discussed, with emphasis on the implications of value exclusion for behavioral compliance with ecosystem decisions and policies.

Value exclusion in social–scientific approaches to assessments

We identified examples of how value is excluded during social–scientific assessments of ecosystem features to which people ascribe value. These include excluding stakeholders, nonattainment of saturation, exclusion of the values ascribed to biodiversity, or failure to distinguish various features of biodiversity (e.g., genetic diversity, species abundance).

Value exclusion via stakeholder exclusion

Valued features of ecosystems can be excluded during assessment procedures when value elicitations only focus on certain

stakeholder groups (e.g., when only experts or local communities are included in value elicitations; Lamarque et al. 2011, García-Llorente et al. 2012, Rolo et al. 2021). Although identifying the values of some stakeholder groups is insightful, some valued ecosystem features may not be captured in the assessment because those to whom such aspects are of value are not consulted. This sort of value exclusion might be problematic for behavioral compliance because the omission of those values means that they will not be congruently articulated in decisions. People are less likely to comply with decisions that do not articulate their values. This may also result in social opposition to those decisions and may trigger social conflict.

Enabling inclusive stakeholder representation in social–scientific assessment protocols uncovers novel valued ecosystem features and prevents the inaccurate estimation of value priorities. For example, the observation that the boundaries of US national forests act as regulators of urban sprawl was a novel regulatory service that emerged from interviews with local community stakeholders in central Oregon, in the United States. This regulatory service did not appear in interviews with other stakeholders—experts, ecosystem managers, representatives of the timber industry, regulatory authorities, and of environmental groups (Asah et al. 2012). Conversely, community members omitted several regulating services including pollination, which experts and representatives of environmental groups mentioned often. The features identified by stakeholders during the assessment procedure were later used in a local community valuation of services provided by the same forest. The results showed that the residents valued urban sprawl regulation more than all climate regulatory functions (Asah and Blahna 2020). Surprisingly, pollination was the third most valued regulatory service, despite being omitted by the same stakeholder group during the assessment process. If local communities were excluded from the assessment process, the high priority attributed to urban sprawl regulation relative to climate regulation would have been unknown to the decision-makers. Similarly, the observation that, to local community members, pollination is of a higher priority than climate regulation would have been missed if the experts were excluded. Therefore, excluding some stakeholders in value elicitations may lead to the exclusion of valued aspects of ecosystems and to the misrepresentation of value priorities, both of which may undermine understanding of how people respond to imminent decisions.

The US national forests' urban sprawl regulatory function has both local and national implications for policy, especially in the context of the lingering debate about privatizing the US national forest system. The purposes of most value assessments are to inform decisions requiring behavioral compliance. Compliance might include social support for forest management policies and political–ecological citizenship alignment (voting for policymakers because of their support of maintaining US national forest boundaries). Therefore, social–scientific approaches to value assessment must ensure comprehensive stakeholder representation. Although it is particularly challenging in some cases to represent all stakeholders, it is important to be as comprehensive as possible. Identifying excluded stakeholder groups allows decision-makers to be aware and to find alternative ways to accommodate the omission of such group values in the decision-making process.

Value exclusion via saturation, context, and interpretive challenges

Value exclusion during social–scientific assessment processes also occurs when saturation—a determination that those engaged in social value assessments have exhausted their expressions of valued ecosystem features (Weiss 1994)—is not attained. With some exceptions (e.g., Klain and Chan 2012), there are generally no indications that saturation was attained. Therefore, it is often unclear whether some aspects of ecosystems to which people ascribe value remain unrevealed. Saturation is particularly important in social assessments because the self-referential expressions of value that typify the deliberative techniques used in such assessments generally occur within unique place-specific cultural contexts. These unique contexts often entail the use of conceptual metaphors (Raymond et al. 2013) and other forms of value expressions that are intimately entangled with the specificities of place and culture so that they might be unfamiliar to the researcher. Understanding such unique value expressions may require culturally appropriate interaction—probing and moderating techniques to overcome translational or interpretive challenges to the attainment of saturation. Otherwise, some valued aspects of ecosystems may not only be omitted but may be misinterpreted (inaccurately revealed) and, therefore, excluded, with potentially significant implications for the social acceptability of and consequent behavioral compliance with management and policy recommendations.

The case of behavioral compliance with fern harvesting policies in the San Bernardino National Forest by Americans of Asian ancestry is an example of problems resulting from value misinterpretation and consequent misprioritization. Although the pricing of fern gathering was based on considerations of ferns as a provisioning service, Anderson and colleagues (2000) found that people of Korean and Japanese ancestry were largely motivated to collect ferns on the basis of cultural values (heritage, nostalgia, social interactions, etc.) rather than on the basis of consumptive or commercial purposes. That is, the cultural value of fern gathering is of higher priority than its provisioning value. But the price of permits was based on the amounts and sales prices charged by commercial gatherers who sold the ferns in urban markets. Consequently, most noncommercial gatherers viewed the price as unfair because they harvested far fewer ferns and spent more time attaining the cultural values that are not—but could have been—explicitly included in fern pricing decisions and clearly communicated to fern gatherers.

The perception of unfairness, resulting from an inadequate understanding of the value priorities of behavioral agents, might undermine the agents' ability to comply with fern-gathering prescriptions. They may choose to harvest more than they need, just to overcome the emotional burden of perceived unfairness, thereby rendering the resource scarcer for others, who may, in turn, perceive unfairness in paying for ferns and not finding enough to harvest. If the purposes of ecosystem decisions are to minimize distributional concerns through the accurate identification of values and value priorities, social–scientific procedures that enable saturation must be employed (Weiss 1994).

Value exclusion via biodiversity assessment

Value exclusion also occurs when biodiversity and its aspects to which people ascribe value are omitted (e.g., Stoeckl et al. 2023) or simply identified in overly broad terms in social–scientific assessment procedures (Stålhammar 2021). Because biodiversity and ecosystem services are entwined considerably, sound policies about the value of ecosystem services are less likely when biodiversity values are omitted (Reyers et al. 2012a, 2012b). For example, biodiversity is known to provide cultural services, and the consideration of only one aspect of biodiversity (species richness)

can undermine the effectiveness of decisions pertinent to cultural values (Graves et al. 2017). In some social settings, biodiversity is valued more than many other types of ecosystem services (Schmidt et al. 2017, Asah and Blahna 2020). Therefore, the exclusion of biodiversity in assessments of ecosystem features and, consequently, in consequent valuations might lead to the misrepresentation of social value and misestimation of value priorities. Similarly, the inclusion of biodiversity in general or without specific attention to its components (e.g., genetic diversity, species richness) amounts to value exclusion. Those who are expected to comply with ecosystem decisions and policies may value, for example, genetic diversity more than they value species richness.

Exclusions of biodiversity or its components and the consequent misinterpretations of value and the misestimation of value priorities may impede behavioral compliance with policies because people often take action that aligns not only with their values but also with their value priorities (Schwartz 1996, Sverdlik and Oreg 2009). This form of noncompliance can exacerbate current biodiversity problems, such as poaching and pollinator declines. Therefore, when assessments of valuable ecosystem features are intended to inform decisions to which people must comply, it will be helpful for such assessments to include biodiversity and clearer distinctions of its particular components.

Value exclusion in social valuations

We identified some occurrences of value exclusion during social valuations of ecosystem features. In the following sections, we describe how the incommensurability of valuation metric is a source of value exclusion. For example, the metric (financial; e.g., in dollars) for economic valuations is incommensurable with that (Likert-type scale ratings) for sociocultural valuations, because different valuation metrics are used. We describe how the widely used Likert-type psychometric scaling protocol can address this issue. We also discuss elements of the design and use of psychometric scaling that leads to value exclusion and highlight implications for behavioral compliance with management and policy recommendations.

Valuation metric incommensurability as value exclusion

Metric incommensurability leads to the misattribution of the salience of the values of ecosystem features and, consequently, to the misestimation of value priorities. The need to address distributional concerns in decision-making warrants accurate determination of both the values and the value priorities of stakeholders. This equity problem partially supports calls for integrated valuations that combine economic, sociocultural, and ecological valuations (Boeraeve et al. 2018, Cook et al. 2019). Unfortunately, the metrics used in these different valuation approaches are incommensurable. For example, the outcomes of valuations are less robust when we compare those derived from the use of psychometric scales with those derived from measures of willingness to pay or contingent valuations (Wright et al. 2017). It is challenging to compare valuations, priorities, and consequent equity assessments using different metrics. Decision-makers resolve to use their judgments in making these comparisons. The judgments of decision-makers may not align with those produced by the psychometric scale raters or with those of the contingent evaluators, resulting in value exclusion through misrepresentation of value and value priorities. The use of distributional weighting techniques to address the inequity problem have led to difficulties in finding a consensus for formulating and quantifying equity weights (Turner 2007). Also, some decision-makers prefer some methods over others, making such weighting unfree of biases that lead to inaccurate value estimations and prioritizations and to consequent decisions that are laden with inequity (Primmer et al. 2018).

Some may be less likely to comply with decisions and policies that they perceive to embody elements of inequity. The use of commensurable valuation metrics will minimize the need for subjective judgments, ineffective distributional weighting techniques, and decision-makers' preferences. Eliminating these forms of value exclusion will enhance social compliance with management decisions and policies by enabling effective estimations of value and comparisons that are crucial for the accurate ranking of values and consequent decision alternatives needed to minimize inequity (Wright et al. 2017). Psychometric scales of the Likert-type hold great promise in addressing the incommensurability problem. With the use of Likert-type scales, subjects can indicate the extents to which individual features of ecosystems are important to them, regardless of their tangibility or availability in the marketplace. It is therefore unsurprising that Likert-type psychometric scales are used commonly in social valuations of ecosystem features. But, as we discuss in the following sections, some aspects of Likert-type psychometric scale design and the protocols employed for social valuation contribute to value exclusion, with implications for social compliance with policies informed by such valuations.

Value exclusion through psychometric valuation

Three main avenues for value exclusion in the design and administration of psychometric valuations are discussed in this section.

Value exclusion via priming effects. Priming effects are stimuli (e.g., audiovisual prompts) that make some mental depictions of features of ecosystems temporarily more accessible and therefore unconsciously more influential on valuation (Schacter and Buckner 1998, Molden 2014). Priming effects occur when requests for valuations are immediately preceded by presentations of researcher-chosen photographs, descriptions, or examples of how ecosystem services and biodiversity may be valuable (e.g., García-Llorente et al. 2012, Huai et al. 2022). Although it is intuitive that people should see what they are valuing and should understand the meaning of value as defined by the researcher, these elements contribute to value exclusion in many ways.

People have their own understandings of what is important to them about a particular ecosystem and act mostly on the basis of those understandings rather than on the basis of what they are made to understand or see in a photograph in a questionnaire. Therefore, priming promotes value exclusion by displacing self-referential understandings and attributions of value, the bases of behavioral responses to value-related decisions (Schultz et al. 2005, Ramcilovic-Suominen et al. 2013). Pictures tell a thousand words, but they depend on the photographer and are likely to evoke different mental processes (e.g., memories, imaginations, considerations) to the valuation subject and to the researcher. Some respondents may not see air purification in a photograph of a forest but may perceive these values in their own imaginations of how the forest may be important to them. Imaginations and memories have significant implications for the values that people ascribe to ecosystem features (Flood et al. 2021). Therefore,

like other primers, photographs may orient the respondents away from and thereby exclude their self-referential mental images of the forest, in which more vivid representations of air purification might be present. We do not need to influence—and, therefore, distort—these imaginations if the goal is to understand what is important to people (research subjects), which is the fundamental purpose of social valuations (Costanza 2000).

The use of multiple primers (e.g., photos and examples of the values of ecosystem features) in the request for respondent valuations also promotes value exclusion. Each primer activates different cognitive representations and consequent social valuation behaviors (Spruyt et al. 2002). In addition, different primers have dissimilar accessibilities (i.e., the ease and speed of activation and availability of mental processes that guide valuations; Higgins 1996, Strack and Mussweiller 1997). Therefore, multiple primers may amplify researcher-induced variance in the performance of social valuations at the expense and, therefore, exclusion of valuations that subjects espouse.

Value inclusion and behavioral compliance with management decisions and policies can be facilitated when social valuations are more self-referential. Accordingly, careful but minimal priming could facilitate self-referential valuations (Fockenberg et al. 2008) and minimize value exclusion. The listing of valued aspects of ecosystems using simple language that, if possible, emerged from interviewees' self-referential expressions could minimize the need for explanations and photographs, thereby reducing priming effects and their value exclusion potential (e.g., Asah and Blahna 2020).

Value exclusion via anchoring effects. Another prevalent source of value exclusion via the use of psychometric scales for social valuations is in the use of response or attribute anchors (i.e., the phenomena that valuation subjects are cueing their valuations on; Gehlbach and Barge 2012). For example, subjects are asked to rate their level of agreement with statements about the importance of particular ecosystem services to society or for human well-being (e.g., McElroy and Dowd 2007, Calvet-Mir et al. 2012). This type of anchoring may exclude value in several major ways. First, it amplifies variability in self-specified anchoring. For example, people conceptualize society differently from the self (local community, state, or nation). A valuation subject is likely to produce different ratings depending on the anchor they select (e.g., whether a particular ecosystem feature is important to their community, their country, or the world). Therefore, researcher-induced and often undiscernible variation in self-specified anchors is a form of value exclusion, because these anchors lead to ratings that are different from what is important to the respondents (Daily et al. 2000). Choosing anchors that are not ambiguous, with less potential for multiple interpretations, will reduce variance in self-specified anchoring and in the resultant value exclusion. This will, in turn, allow decision-makers to more clearly articulate values in their decisions and therefore enhance social compliance.

Another avenue for value exclusion through anchoring involves the misuse of attribute equivalence, the idea that two descriptors of an aspect of ecosystems have a similar meaning (Michell 2004). For example, when asked to rate what is important for society or human well-being, the response cue is *society or human well-being* and not the self or the respondent's own well-being. The farther the anchor is from the self, the likelier the inaccuracy of the respondents' valuation. Most importantly, the extent of one's agreement with what is important to society or for human well-being and their ratings of the extent to which that same ecosystem feature is important to the respondent themselves may be different. One may agree more that timber is important for a sector of society's socioeconomic well-being than that timber harvesting is directly beneficial to the respondent. That is, the degree of agreement about the importance of aspects of ecosystems to some entity, other than the respondent themselves, may have attribute inequivalence with the extent to which that aspect is important to the respondent. This constitutes value exclusion, because the essence of valuation is about what is important to the respondent, the aggregation of which is inferential about what is important to the social collective.

Attribute inequivalence also leads to value exclusion because subjects occupy different positions on the self-interest to selflessness motivation spectrum. Subjects with prevailing self-interest tendencies (Zlatev and Miller 2016) are more likely to ascribe less value to an ecosystem feature when the anchoring attribute is society than when the anchor is the self. Conversely, subjects with dominant tendencies toward altruism are likelier to indicate a higher valuation of a feature when the anchoring attribute is society than when the anchor is the self (Kurzban et al. 2015). The conflation of society and the respondent's own interest in the request for and interpretation of social valuation leads to misattribution of the salience of value, which is underestimated for those with self-interest tendencies and overestimated for those with altruistic tendencies.

Because people act on the basis of their value tendencies, attribute equivalence is particularly important for behavioral compliance. Consistent with their valuations, those with dominant self-interest tendencies are likelier to act on the basis of what is important to them than on what is important to society, whereas those with more altruistic tendencies are likelier to act on the basis of what is important to society than to what is important to themselves. So, attribute inequivalence can lead to social compliance outcomes that are the opposite of the expectations and intentions of decision-makers if the value priorities are reversed for specific interest groups that exhibit dominant displays of self-interest or altruism. Therefore, attribute inequivalence excludes value and value priorities, thereby undermining the ability to anticipate social compliance with policies. The value exclusion potential of attribute inequivalence can be minimized by using ratings of importance that are anchored to the self. An example of a primer would be, *Please rate the extent or degree to which the following features of the forest are important to you*.

Value exclusion via social desirability

Social desirability bias is another source of value exclusion in psychometric social valuations. Social desirability is a phenomenon whereby ratings of ecosystem features are influenced more by what the valuation subjects think is expected of them than by what is truly important to them (Spector 2004). Social desirability is likelier when the valuation elicitations involve direct interpersonal interactions, such as face-to-face interviewing between the researcher and the subject (Roxas and Lindsay 2012, Kaminska and Foulsham 2016). Therefore, akin to leading the witness in legal situations, the nature of social interactions between the researcher and their subjects might facilitate value exclusion. This is also the case when using intercept surveys (e.g., administering surveys to recreationists in a nature-based setting). In addition to the presence of the researcher, recreationists may hastily complete surveys to please the researcher but without much reflection or self-reference so that they can go about with their intended recreational activities. Social desirability can also occur in situations of heightened social sensitivity (e.g., conflict around a

particular ecosystem or impending decision or policy) that may prevent respondents from rating the true importance of certain ecosystem features (Jo et al. 1997). Assumptions about whether the requester and potential users of the social valuations are on the same or different sides of the conflict may influence the levels of comfort with which the respondents reveal their true valuations (Tourangeau et al. 2000). The value-exclusionary potential of social desirability can be curtailed when interactions between researchers and subjects are minimized, opportunities for subjects to self-reflect are provided, the immediate presence of the researcher is minimized, and considerations about potential respondent sensitivities inform the wording of valuation requests. There are many other ways in which social desirability can be controlled (e.g., Gordon 1987, Jo et al. 1997, Perinelli and Gremigni 2016).

Conclusions

Value inclusion is important on the grounds of fairness, justice, and equity and for facilitating behavioral compliance with policies. So far, value inclusion has been informed largely by critiques of economic or ecological approaches to value assessments and valuations, because scholars continue to point to how and when value is excluded in such assessments and valuations. Nonetheless, social–scientific approaches to value assessments and valuations also exclude value with noteworthy implications for social compliance with management and policy recommendations.

As was urged by Daily and colleagues (2000), values used in social decision-making should be derived from those held by individual citizens and not be imposed by external agents. Unfortunately, values are imposed on citizens during social–scientific approaches to the assessment and valuation of ecosystem features. To minimize the imposition of values and to enhance social compliance, social scientific value assessments should be conducted with careful attention to comprehensive stakeholder representation, attainment of saturation during value elicitations, sensitivity to the culture of place, and including biodiversity and its components. Similarly, social–scientific approaches to valuations should facilitate behavioral compliance with ecosystem management decisions and policies by ensuring metric commensurability, paying attention to priming effects and the appropriate use of response attribute anchors when designing psychometric scales. The effects of social desirability must be considered and minimized when administering social valuations.

The view persists that decision-makers can make decisions that influence people's lives while being fair, just, and equitable. Nonetheless, that view should not undervalue the fact that people have the discretion to ignore or act against policy prescriptions, even when their values are considered but are of a lesser priority than other values attainable through noncompliance. The extinction of species and ecosystem degradation is due, in part, to the absence of policies, as well as to the fact that people are not taking expected actions to meet policy objectives. Omitting or misrepresenting people's values in assessments and valuations that inform those decisions undoubtedly contributes to noncompliance with ecosystem services policies. People will not act in ways that are dissonant with their values, especially their value priorities (Schwartz 1996).

The science policy community has been largely preoccupied with value typologies. Values are important because of what they are but even more so because of what they do (i.e., the things that values enable people to accomplish). The meanings of value to the subjects of assessments and the beneficiaries of value inclusion are associated with the things that those values enable them to do. Therefore, value functions must be understood when we consider those values in making decisions about ecosystems if a goal is to enhance social compliance with ecosystem management decisions and policies.

As has been implicitly urged by the Intergovernmental Platform for Biodiversity and Ecosystem Services, people's values and especially their value priorities must be considered in management and policy, whether these people are traffickers, marginalized, underprivileged, indigenous, organized social groups (e.g., fishers), or illiterate, because individuals understand and value ecosystems in unique ways and from their own frames of references. The onus is for researchers whose works inform policy to appropriately elicit, capture, and make relevant those understandings. If research is to inform effective decisions, it must engage in comprehensive value identification and accurate determination and comparison of the values and value priorities of stakeholders. By so doing, the research will ensure better social or sociocultural value assessments and valuations of ecosystem features, which will improve decision-makers' abilities to anticipate and manage social responses to policies and thereby render such policies more likely to be effective.

Acknowledgments

Our participation in various initiatives with the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, particularly the Values Assessment and the Global Assessment, provided the impetus for the manuscript. Lynne Westphal provided insightful guidance during the early phases of thought that led to this effort. This effort was undertaken, in part, thanks to funding from the Canada 150 Research Chairs Program.

Author contributions

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Received: May 16, 2023. **Revised:** July 10, 2023. **Accepted:** July 12, 2023