

Addressing the practical and ethical issues of nudging in environmental policy

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1. Introduction

Nudging, or the subtle design of the context of choice in a way that mobilizes the unconscious mind and alters human behavior predictably (Thaler and Sunstein, 2008), has come under severe criticism for entailing numerous practical and ethical problems. A critical reading of nudging and its critics indicates that the polarization of views stems from theoretical underpinnings that can be questioned on both sides of the debate in light of recent developments in social and cognitive sciences. These developments reflect an intellectual shift away from a purely rationalistic conception of human being toward conceptions that incorporate the unconscious intuitive processes of the mind. Embracing the intellectual shift, I argue, inspires an approach to nudging that bypasses the dichotomy between conscious and unconscious processes of the mind, and embraces an integrative view. More specifically, I will argue that environmental governance researchers have a responsibility to consider nudging in their work, because the unconscious mental processes that underlie nudging are writ large in the governance of common pool resources.

Nudging departs from the behavioral assumptions underlying contemporary environmental policy instruments. Nudging is based on the so-called dual model of cognition. The model distinguishes between cognitive processes that are fast, automatic and unconscious (type 1 processes) and those that are slow, deliberative and conscious (type 2 processes). A glance at today's predominant environmental policy instruments indicates that they rely largely on type 2 cognitive processes. Command-and-control, economic, and voluntary instruments assume that human beings are rational optimizers capable of weighing risks and benefits.

Nudging has been criticized on ethical grounds for being manipulative and patronizing (Bovens, 2010; Hausman and Welch, 2010; Selinger and Whyte, 2011; Wilkinson, 2013), on societal grounds for being undemocratic and elitist (Selinger and Whyte, 2011), and on cultural grounds for being culturally biased and blind to variable interpretations (Bovens, 2010; Selinger and Whyte, 2011). The controversy originates in different theoretical underpinnings. On one hand, behavioral economists defending nudging adhere to an individualistic and voluntaristic view, in which social phenomena are seen to emerge from the bottom up as a result of individual members of society making choices. On the other hand, social scientists criticizing nudging emphasize the role of top-down macro-level socio-cultural processes, such as cultural orientations, institutional arrangements and political processes, in determining the fate of societal evolution. What unifies the two sides of the controversy is a belief in the rationality of human thought and behavior. This shared belief, however, is not entirely consistent with recent findings of cognitive and social sciences, particularly in the fields of embodied cognition and practice theory.

There are good reasons to take nudging seriously in environmental policy. Environmental policy typically deals with common pool resources, which face the challenge of balancing the inevitable exhaustion of limited resources with the difficulty of excluding additional resource users. The design principles for sustainable governance and management of common pool resources emphasize local participation and deliberation (Ostrom, 1990) – practices characterized by nudging and other unconscious behavioral influences (Amir and Lobel 2008). Paradoxically, they are also practices indispensable for settling the complex ethical, social and cultural issues of unconscious behavioral influences (John et al., 2011; Jones et al., 2013). Awareness of the prevalence of unconscious behavioral influences in environmental governance is a prerequisite for tackling the complex practical and ethical issues of nudging.

My aims in this article are, on one hand, to show that unconscious behavioral influences permeate environmental governance; on the other hand, to outline analytical approaches for revealing the type, degree and emergence of unconscious behavioral influences in the practices of environmental governance. I first introduce the current distinction in cognitive and behavioral sciences between the fast unconscious and the slow conscious processes of the mind, discuss their role in efforts to influence human behavior, and provide an overview of the critique of nudging (Section 2). I then show that the critique is based on mistaken dichotomies of the human mind, which call for a better understanding of the type and degree of unconscious influences, and the processes by which such influences arise in social practices. I go on to outline analytical approaches for improving such understanding in environmental governance, drawing on environmental governance theory, practice theory and cognitive linguistics (Section 3). In conclusion I discuss the implications of the analytical approaches for contemporary environmental governance (Section 4).

2. Material and methods

2.1 Dual model of cognition

The idea that the human mind is characterized by fast and slow processes has gained ground in cognitive linguistics (Lakoff and Johnson, 1980, 1999), behavioral economics (Kahneman, 2011; Thaler and Sunstein, 2008), social psychology (Aronson, 2012; Zajonc, 1980) and neuroscience (Clark, 2011; Damasio, 1994; Dennett, 1991), among others. This so-called dual model of cognition makes a distinction between fast, automatic and unconscious cognitive processes (type 1 embodied processes) and slow, deliberative and conscious cognitive processes (type 2 informational processes). According to the model, the two processes are interlinked so that the human mind can rapidly identify and retrieve knowledge for conscious processing. This would indicate that type 1

processes supply a continuous stream of relevant content into working memory for type 2 processes, and that the human mind can synchronize the two processes (Evans, 2008).

The dual model of cognition is a hybrid composed of two very different models of the mind. According to the historically predominant type 2 model, cognition is information processing. Cognition is understood to take place inside the brain, which interacts with its social and physical environment through inputs and outputs. Sensory inputs are transformed into symbols in the brain, where they are processed in algorithmic processes as in a computer. The results of the symbolic processes are then transformed into motoric outputs (Bermúdez, 2010; Shapiro, 2011; Simon, 1996). Empirical research in social psychology (Zajonc, 1980), neuroscience (Damasio, 1994; Dennet, 1991) and situated cognition (Clark, 2011; Robbins and Aydede, 2009), among others, has modified the simplified information processing model by emphasizing that cognition is a function of the social and material environment and that algorithmic processes often do not happen. This has paved the way to the type 1 model of cognition.

According to the type 1 model, cognition is embodied. The way an organism such as a human being conceptualizes its environment depends on the kind of body it has. The idea of an organism's body interacting with its environment questions the representational processes that are the foundation of the information processing view. The body and its environment are thought to play a constitutive rather than just a causal role in cognitive processing (Shapiro, 2011; Thelen, 2000). If the computer is the machine analogy of type 2 cognition, the analogy for type 1 cognition is James Watt's centrifugal steam engine governor. The Watt governor regulates the power of the engine with a flywheel that is physically attached via levers and pivots to the engine so that it automatically reduces the power when the engine speeds up and vice versa (Shapiro, 2011: 119-123).

An illustrative example of type 1 embodied cognition is the primary metaphor, a core concept of cognitive linguistics. The primary metaphor is considered to be a fundamental unit of language and thought that connects subjective experience with sensorimotor experience (Feldman, 2006; Lakoff and Johnson, 1980, 1999). Thus, even the most abstract concepts of cultural production are embodied in human experiences taking place in the social and material environment. In the primary metaphor *Affection is warmth*, for example, the sensorimotor experience of temperature is projected onto the subjective experience of affection. The association is based on neural connections, in other words, the judgment of affection automatically triggers the experience of warmth. Primary metaphorical associations have evolutionary roots. The hard-wiring of *Affection is warmth*, for example, can easily be understood as the result of thousands of years of repetitive experience by the human child being held in mother's arms (Hukkinen, 2012). As a result, primary metaphors are largely universal and have been empirically observed across cultures and languages (Feldman, 2006; Lakoff and Johnson, 1999).

The dual model of cognition has parallels in the behavioral sciences more broadly. In behavioral economics, nudging has gained prominence as a potential policy instrument grounded in the fast, intuitive and unconscious aspects of the mind.

2.2 Nudging and its critics

According to behavioral economics, a nudge is 'any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives' (Thaler and Sunstein, 2008: 6). Choice architecture refers to the social and physical context in which people make decisions. Nudging is grounded in an ideal of libertarian paternalism, where the term libertarian refers to policies that maintain or increase freedom of

choice, and paternalism to the design of choice architecture in a way that makes the choosers better off, as judged by themselves. Based on empirical findings, nudging adjusts the neoclassical economic assumption that most people most of the time make choices that are in their best interest. In reality, the context of decision making inevitably biases human choices, often unbeknownst to the chooser. Therefore, the proponents of nudging argue, gentle designed changes in the choice architecture that improve the choosers' lot are not coercion, but simply good governance (Thaler and Sunstein, 2008).

Thaler and Sunstein (2008) operationalize nudging in six devices: giving incentives, understanding mappings, designing defaults, giving feedback, expecting error and structuring complex choices. Giving incentives infuses regular market instruments with the reality that humans frequently react unconsciously and rapidly to various visible incentives (e.g., placing candy at the checkout). Understanding mappings refers to making the consequences of choosing particular options clearly understandable to individuals (e.g., transparent pricing structures for credit cards). Designing defaults benefits from people's tendency to opt for decisions that take the least effort (e.g., having a vegetarian meal as the default). Giving feedback refers to letting people know immediately whether they are making mistakes or performing well (e.g., online electricity metering). Expecting error means designing technologies and spaces with the aim of preventing and tolerating human error (e.g., allowing several password trials). Finally, structuring complex choices aims to make free choice easier by narrowing down the range of options (e.g., online stores recommending customers what to buy on the basis of earlier shopping (Jones et al., 2013; Thaler and Sunstein, 2008).

The nudging devices have recently been subjected to considerable academic and policy critique. The critique comes in three broad camps: ethical, societal and cultural. Those criticizing nudging on ethical grounds argue that it is manipulative and patronizing. Critical ethical issues arise when an

intentional actor successfully influences a subject's decisions or behavior, without the subject being aware of this modification (Hausman and Welch, 2010; Selinger and Whyte, 2011; Wilkinson, 2013). As a result, the critics argue, the nudgers project their values and preferences onto those being nudged, raising critical questions about the political legitimacy of professional choice architects manipulating individual choices and the grounds for setting behavioral defaults (Dobson, 2011; Jones et al. 2013). Worse, this may lead the nudgees to unload moral responsibility for their actions to nudging and behave differently when nudged from how they behave when making decisions on their own (Bovens, 2010; Selinger and Whyte, 2011). For example, when people become aware of their biases, they may begin to ignore policies that assume biased behavior (Amir and Lobel, 2008). There is also a danger of stigmatizing certain segments of the population (e.g., alcoholics, overweight individuals) should they become the primary targets of nudging (Jones et al., 2013).

The societal critics of nudging argue that it is undemocratic and elitist. Nudging is thought to devalue the public sphere, as matters of personal conduct are outsourced to experts in the behavior management industry. As a result, public life is impoverished when complex cultural and moral matters are reduced into simple questions of behavioral economics. This is a problem for democracy, because there are no legitimate public procedures for determining which biases should be nudged and which not. Furthermore, nudging can become a slippery slope, as more and more influence over individuals' behavior is shifted beyond their control (Selinger and Whyte, 2011). Furedi (2011) blames such libertarian paternalism for being a novel form of intolerance, because it is based on the conviction that government knows best what is good for the individual. The societal critique boils down to questions concerning power: Is the role of governance to empower citizens by providing information for better decision making, or to disempower them with subconscious nudges designed by a behavioral management elite? Should governance empower citizens with

trial-and-error learning or should it strive for maximal rationality of governance decisions (Dobson, 2011; Jones et al., 2013)? And should governance even strive for rationality, or should it also allow individuals to make decisions that do not maximize welfare (Amir and Lobel, 2008)?

Finally, the cultural critique has to do with the cultural insensitivity of nudging. According to the critics, existing nudging instruments largely assume a short-term market orientation, which easily pushes cultural orientations stressing long-term public deliberation to the sidelines (Dobson, 2011; Jones et al., 2013; Raihani, 2013). Furthermore, the perception of meaning varies depending on the cultural context. This semantic variance renders nudging inevitably culturally biased, when the meaning of the same act of nudging is interpreted differently across cultures because of perceptual, cognitive and behavioral variance (Bovens, 2010; Raihani, 2013; Selinger and Whyte, 2011). Since social practices are historically and culturally specific, there are limits to transferring the lessons obtained in the study of practices from one setting to another (Shove et al., 2012). Underlying this ignorance of the cultural specificity of choice is the nudging theorists' narrow epistemological assumption, which equates the social sciences with a science of choice. In the realm of governance this assumption justifies the idea that rational choice architects can guide the less rational consumers to behave more rationally in competitive markets, a stance that is blind to the diverse cultural patterns and the unintended consequences of nudging (Jones et al., 2013).

2.3 Further developments of nudging

Policy researchers have responded to the critique of nudging in various ways. Jones et al. (2013) categorize the responses into approaches they label Think, Steer and Punch!. Think is a strategy that combines nudging with local level deliberative democracy so that citizens can make informed choices to change their behavior on the basis of a public dialogue. In this sense, it is an effort to

respond to the ethical critique of manipulation and societal critique of discounting democracy that were outlined in Section 2.2. Ideally, nudging, or ‘giving information and social cues so as to help people do positive things for themselves and society’, should coexist with thinking, or getting ‘citizens to think through challenging issues in innovative ways that allow for evidence, and the opinions of all, to count’ (John et al., 2011: 9-10). Citizens at the local level should be allowed to judge how, where and when to nudge themselves.

Steer takes the Think approach further by arguing that in addition to public deliberation, citizens should think about thinking, or how they end up making the choices that they do. In practice, the approach consists of deliberative workshops whose participants learn about the behavioral economic and neurological fundamentals of how the brain works and how individuals make systematic mistakes in decision making. The aim is to empower people to take charge of their behavior and practices. Steer is an enlightenment project for the 21st century, arguing that although humans are not rational in what they do, as neurologically reflexive individuals they can at least rationalize what they do (Jones et al., 2013). The model of a neurologically reflexive individual endowed with a capacity to rationalize enables Steer to respond to the ethical and societal critiques of nudging with a more refined conceptual framework than Think does.

Finally, the Punch! approach problematizes behavioral governance as a whole by aiming to reveal its underlying power interests (Jones et al., 2013). Although sympathetic toward the empowerment intentions of Steer, Punch! criticizes the approach for assuming a universal theory of a neurologically reflexive human subject, which fails to account for the power relations that underpin the formation of this subject. Punch! offers an analytical framework grounded in social theory for critical evaluation of the various behavioral governance approaches. It questions expertise as a convenient fiction, be it that of the policy expert designing nudges or the empowered citizen expert

of Steer. It argues that the object of governance should be power relations embedded in social practices, rather than behavior (as in nudge and Think) or the self-reflexive brain (as in Steer). And it maintains that the human subject is neither an irrational decision maker (as in nudging), nor a deliberative stakeholder (as in Think), nor a neurologically reflexive individual (as in Steer), but rather a historically, spatially and socially situated individual. As such, Punch! is a call for constant vigilance in the face of behavioral governance efforts – ‘... a call to consider the specific circumstances in which the changed behavior of the human subject is offered as a solution to the social, economic, environmental and political crises of the twenty-first century’ (Jones et al., 2013: 190).

Think, Steer and Punch! each offer constructive responses to the ethical, social and cultural problems of nudging, climaxing in Punch! as a social theoretical meta-critique of all efforts to formalize a behaviorally and neurologically based conception of the human subject. Instead, Punch! proposes a situated approach that aims to understand the social and material conditions, particularly power relations, in which the human subject becomes known. The approach appears reasonable in light of the complex ethical and social issues that nudging raises. Yet in what follows I will argue that even Punch! cannot escape the fact that the very conditions in which the human subject becomes known can only be known in ways that are characteristic of human beings. This, in turn, makes it necessary for governance analysts to face head-on the issue of automatic, unconscious and unintentional features of human practices.

3. Results

The following analysis begins with a diagnosis of what I consider to be exaggerated dichotomies in earlier critiques of nudging. The diagnosis can be summarized as a need to understand better the

degrees of behavioral influence in different governance settings and the processes by which such influences emerge (Section 3.1). As a background to responding to these analytical needs in environmental governance, I outline the main types of natural resource and the principles of governance that have been observed to contribute to sustainable utilization of natural resources (Section 3.2). I then show that the analytical framework for determining the degree of behavioral influence is uniquely suitable for considering the spectrum of policy influences in environmental policy (Section 3.3). Finally, I illustrate with concrete cases of natural resource governance how the analytical framework for identifying the processes by which behavioral influences emerge shows promise when applied to specific practices of environmental governance (Section 3.4).

3.1 Mistaken dichotomies of nudging: Two systems of mind and two classes of citizen

The three improvements to nudging – Think, Steer and Punch! – strive to resolve the observed ethical, social and cultural problems with an increasing degree of social critique. What these proposals pay less attention to is that the cognitive process by which human subjects form an understanding of the social and material designs that shape their action is itself shaped by those social and material designs. Thus, any deliberative forum created to enable critical questioning of the efficacy, ethics and power implications of behavioral change governance embodies necessarily the same material and social mechanisms of unconscious influence that the forum aims to question. The fate of human beings as socially and materially circumscribed organisms is to constantly nudge and be nudged.

The failure to recognize the all-encompassing nature of automatic unconscious processes of the mind can be traced to two mistaken dichotomies, both of them reflected in the critiques (Section 2.2) and further developments (Section 2.3) of nudging. The first dichotomy is the idea of a dual

cognition divided into fast, automatic and unconscious processes and slow, deliberative and conscious processes. The second dichotomy is an extension of the first dichotomy at the societal level and suggests a society divided into irrational powerless citizens controlled by rational powerful elites. Both dichotomies need qualification.

Although many cognitive scientists and psychologists have made it clear that the *two systems of the mind* are ‘fictitious characters’, evoked only to describe rather than explain what goes on in the mind (Kahneman, 2011: 29), the characters have in the behavioral governance literature often assumed an explanatory role, implying distinctly separate processes. Yet as was explained in Section 2.1, type 1 and type 2 processes of the mind are actually deeply intertwined. An illustration of this integration is the cognitive linguistic concept of primary metaphor, the fundamental unit of language and thought that connects sensorimotor with subjective experience. The connection is neuronal, making it a fast, automatic and unconscious type 1 process. However, as a fundamental unit of all language and thought, this type 1 process is also constitutive element of the more abstract, higher-order mental constructs that are the products of the slow, deliberative and conscious type 2 processes of the mind. Thus, the ‘irrational biases’ underlying nudging are part and parcel of the ‘rational free will’ with which many critics of nudging would tackle its ethical, social and cultural issues.

To address the ethical, social and cultural concerns of behavioral governance, an improved understanding is needed of the ways in which type 1 systems of the mind are integrated into higher-order type 2 mental constructs. Here I see potential for fruitful interaction between cognitive linguistics and practice theory. In cognitive linguistics, the integrative cognitive process that combines primary metaphors into higher-order mental constructs is known as conceptual integration (Fauconnier and Turner, 1998). Conceptual integration enables the generation of new meanings and

understandings through metaphorical combination, first by integrating primary metaphors into more complex metaphorical constructs called event structure metaphors (Lakoff and Johnson, 1999), which in turn are integrated into ever more complex metaphorical constructs (Fauconnier and Turner, 1998; 2002; Grady, 2005). Conceptual integration has been observed not only in language, but also in the evolution of material artefacts (Arthur, 2009; Hutchins, 2005). Intriguingly, the products of conceptual integration, such as meanings and materials, have recently been identified as the key elements that make up social practices (Shove et al., 2012). Furthermore, the process by which practices have been found to be integrated from materials, meanings and competences is strikingly similar to conceptual integration. Just as materials, meanings and competences can each be thought of as composed of primary metaphors, likewise social practices can be understood as composites of materials, meanings and competences (Figure 1).

[INSERT FIGURE 1 HERE]

The similarities between cognitive linguistics and practice theory are not, however, limited to the modular conceptual hierarchy displayed in Figure 1. Despite differences in intellectual origins, cognitive linguistics and practice theory contain conceptual extensions to each other – extensions that guide analysis of behavioral governance beyond the dichotomy of two systems of the mind. Cognitive theorists argue that cognition is embodied and extended beyond the brain to the human body and its operating environment (Clark, 2011), while practice theorists promote the idea that social practices are emergent properties of massively connected cognitive processes of the brain (Schatzki et al., 2001). To understand better the role of unconscious processes in governance, a promising way forward would be to enrich the ongoing study of the enactment and disintegration of social practices with details of how the elements of practices emerge from primary metaphors. This

task is beyond the scope of this paper, but I will sketch an outline of an empirical application in Section 3.4.

The second mistaken dichotomy underlying the debate over unconscious processes in governance – the idea of a *society divided into irrational citizens controlled by rational elites* – also needs qualification. In contrast to the myth of freely choosing individuals threatened by behavioral managers that still haunts some critiques of nudging (e.g. White, 2013), all human beings constantly employ both type 1 and type 2 processes in their social interactions. This is not to deny that some are in a position to exploit such processes for power purposes more than others. A remedy identified in all of the constructive critiques of nudging summarized in Section 2.3 is some form of social deliberation to empower those potentially exploited by nudges. Paradoxically, however, deliberative processes with intensive social interaction bring forth tendencies among participants to nudge others (Amir and Lobel, 2008; Aronson, 2012). Thus, to obtain a more realistic and detailed picture of the ethical and power implications of behavioral influences, a typology of degrees of influence in behavioral governance is needed. Such a graded scale of behavioral influences would help deduce the power implications embedded in various social practices.

Building on the degree of reliance on type 1 and type 2 processes, Saghai (2013) has developed a useful typology of influences that a policy can have on individual decision making. The typology also specifies the meaning of nudging in relation to other forms of policy influence. Behavioral influences that rely primarily on type 2 rational cognitive processes can be either fully controlled by the influencer, which in practice means coercion, or not at all controlled by the influencer, which in practice means persuasion. In contrast, behavioral influences that rely largely on type 1 ‘shallow’ cognitive processes can be characterized by the degree of ‘substantial non-control’ by the influencer, which in practice refers to the ease with which the influencee can resist the influencer.

The result is a taxonomy of influences depending on the degree of control the influencer has on the influencee (Table 1): (1) full control (choice elimination, compulsion, coercion); (2) substantial control with type 1 processes (behavioral prod); (3) substantial control or non-control with costs or benefits (disincentives, incentives); (4) substantial non-control with type 1 processes (nudges); and (5) full non-control (rational persuasion).

[INSERT TABLE 1 HERE]

For my discussion, the interesting mechanisms of influence in Table 1 are those that mobilize the shallow, type 1 cognitive processes, that is, behavioral prods and nudges. With a behavioral prod the influencer makes it more likely that the influencee will behave according to the influencer's intentions by triggering the influencee's type 1 cognitive processes, while the influence preserves the influencee's choice set but is substantially controlling. An example of a behavioral prod would be psychological priming of university students with inspiring or depressing texts before an exam to boost or diminish their exam performance (Aronson, 2012). In this case, the influence is substantially controlling because the students cannot easily resist the effects of priming. In contrast, with a nudge the influencer achieves the same outcome with substantially non-controlling influence, that is, influence that the influencee can easily resist. Placing the stairway of a hotel prominently at the main entrance and the elevators further back would be an example of a nudge, because the hotel guests can easily choose not to take the stairs and instead look for the elevator.

When considering the ethical implications of policies relying on shallow, type 1 cognitive processes, Saghai (2013) uses self-determining life as the criterion for determining how to weigh different individual liberties when a policy to safeguard public welfare interferes with such liberties. A self-determining life is a life largely free from the exercise of power by other individuals and

social institutions, and endowed with adequate resources and opportunities for the individual to execute a plan of life. ‘The overarching ethical goal is to secure a substantial degree of control over the broad shape of one’s life’ (Saghai, 2013: 493). Policies based on behavioral prodding have difficulty passing this criterion, because they are based on substantial control over an individual’s choices. Nudging is different, however. Focusing on health care policies, Saghai (2013) argues that the moral import of nudging is to consider the balance between the need for policy intervention in individual choice and the need to secure individual liberty: substantially non-controlling influences (i.e., nudges) are permissible and preferable to more controlling influences ‘when the liberties interfered with are sufficiently weighty to require a presumption in their favor, but do not deserve to be strongly shielded from external interference’ (Saghai, 2013: 493).

Following Saghai’s (2013) ethical reasoning, nudging meets the requirement of ensuring a self-determining life for an individual. The conception of nudging as a substantially non-controlling influence also counters the common critique that nudging is manipulation. Nudging is not manipulative as long as the subjects of policy influence have the freedom to easily resist the nudge by applying their type 2 reasoning to consider alternatives. In contrast, behavioral prodding as a substantially controlling influence is ethically more problematic because of its manipulative potential.

In practice, the distinction between behavioral prods and nudges is blurred, because how easily an influence can be avoided is always going to remain open to debate. Nudges based on default choices, such as prominent positioning of hotel stairways, are behavioral prods when viewed from a longer term perspective, as individuals gradually and unconsciously begin to regard particular choice architectures as ‘normal’ and others ‘abnormal’ (Bowker and Star, 1999; Shove et al., 2012). Conversely, behavioral prods such as psychological priming of students turn into nudges, when

students become aware of priming, learn to expect it and maybe begin to do it to themselves (Aronson, 2012).

In sum, the mistaken dichotomies of behavioral influence highlight the need articulated by Earls (2009): since rules also apply to the unconscious mind, the task is to reveal them. There is a need to understand, on one hand, the type and degree of behavioral influence at play in various deliberative governance settings; on the other hand, the processes by which such influences emerge from social practices and their underlying embodied mental constructs. These findings are uniquely relevant for environmental governance, whose design principles have long emphasized the need to take into account local practices of environmental management and local participation in the crafting of the rules of management (Ostrom, 1990).

3.2 Principles of governance contributing to sustainable use of natural resources

Four different types of resource use can be identified on the basis of the degree to which the addition of a new beneficiary reduces resource availability for other beneficiaries (subtraction) and the difficulty of excluding beneficiaries from the pool of resource users (difficulty of exclusion): toll goods, private goods, public goods and common pool resources. For toll goods, both subtraction and difficulty of exclusion are low. An example would be tolls collected from vehicles crossing a bridge. The availability of the resource – the bridge – is not much diminished for other drivers when an additional vehicle enters the bridge, at least without traffic congestion. It would also require considerable investment to exclude additional drivers from entering the bridge. For private goods, subtraction is high but difficulty of exclusion is low. The vehicles themselves are typically private goods, that is, when driven by a driver a vehicle is not available for other drivers, and preventing other drivers from using the vehicle is easy. For public goods, subtraction is low but difficulty of

exclusion is high. City streets are a typical public good, because availability for other users is not much diminished with an additional driver (again, assuming no congestion) and it would be difficult to build an infrastructure to exclude additional drivers. For common pool resources, both subtraction and difficulty of exclusion are high. Congested city streets turn into a common pool resource when congested. Each additional driver reduces the availability of streets for other drivers and it is difficult to exclude additional drivers (Ostrom, 2005) (Table 2).

[INSERT TABLE 2 HERE]

As observed in numerous studies, the key challenge in developing rules for resource use is regulating the amount of resources available to safeguard the public interest (subtraction) while controlling whose private interest is served by guaranteeing access to the resource (exclusion). The tensions climax in free-riderism in the common pool resource case, where individual users have the interest to use as much of the resource as soon as possible, while the collective interest of the greater community of users is to somehow limit such use to prevent the exhaustion of the resource (Ostrom, 1990).

Elinor Ostrom (1990, 2005) investigated governance principles that contribute to sustainable resource use, that is, use that avoids free-riderism and lasts over generations without threatening the ecological basis of the resource. According to Ostrom, attention should be paid to clearly defined boundaries, congruence between rules and local conditions, collective choice arrangements, monitoring, graduated sanctions, conflict resolution mechanisms, recognition of rights to organize, and nested enterprises. Clearly defined boundaries refer to the boundaries of resources and its users, so as to make it clear who is authorized to utilize the resource and where utilization is authorized. Congruence between rules and local conditions emphasizes the need to clarify the relationship

between the benefits and costs of sustaining the resource system. Collective choice arrangements aim to enhance the participation of users in the design of rules for using the resource. Monitoring of appropriate behavior needs to be organized so that the monitors are accountable to the resource users or are the users. Graduated sanctions are sanctions that have been adjusted so that those making small infractions are warned only to an extent that does not endanger their long term compliance. Conflict resolution mechanisms provide users with rapid access to low-cost local arenas to resolve their conflicts. Recognition of rights to organize means that users have the right to devise their own institutions that are not challenged by external governmental authorities. Finally, nested enterprises refer to governance systems in which all of the functions described in the preceding principles are organized in multiple polycentric layers, where the rules at a particular layer are devoted to solving governance problems at that particular layer (Ostrom, 1990: 90; 2005: 271).

As I will illustrate in Section 3.4, the implementation of the principles of sustainable environmental governance requires practices that rely on a number of unconscious behavioral influences. First, however, it is necessary to consider the overall distribution of different behavioral influences across resource types.

3.3 Matching policy influences and resource goods

To consider the spectrum of policy influences at play in environmental policy, I have matched the typology of resource goods with Saghai's policy influences from Table 1. The result of the matching is summarized in Table 2. The criterion for matching is one of least resistance, by which I mean two things implied by the typology of resource goods: the ease of controlling individual behavior and the need to control individual behavior to prevent resource exhaustion. The ease of

controlling individual behavior governs placement along the axis measuring the difficulty of excluding beneficiaries in Table 2, with the least controlling influences placed at the difficult-to-exclude end and the most controlling influences at easy-to-exclude end of the axis. The need to control individual behavior guides the placement of influences along the axis measuring the subtractability of resource use, with the least controlling influences placed at the low-subtractability end and the most controlling at the high-subtractability end of the axis. Thus, according to the logic of least resistance, if the exclusion of beneficiaries is easy and the need for control is high because of high resource subtraction, fully controlling influences are applied; and if the exclusion of beneficiaries is difficult and the need for control is low because of low resource subtraction, non-controlling influences are applied.

In Table 2, the straightforward cases of matching resource goods with policy influences are where the need for control and the ease of control go hand in hand. Thus, when subtractability of resources is low and it is difficult to exclude beneficiaries (public goods), the least resistance option is either no policy influence or fully non-controlling influence such as rational persuasion: there is little need for policy influence because of low subtraction of resource and the influence would be costly anyway because of the difficulty to exclude beneficiaries. In contrast, when subtractability of resources is high and it is easy to exclude beneficiaries (private goods), the least resistance option is fully controlling policy influence such as choice elimination, compulsion or coercion: policy influence is needed because resources are easily exhausted and the influence is feasible because beneficiaries can be easily excluded.

The more challenging cases in Table 2 are when the need for control and the ease of control do not go hand in hand. In these cases, policy influences need to strike a balance between control and non-control. When subtractability is low and exclusion easy (toll goods), the least resistance option is

modest non-control such as disincentives, incentives or nudges: strong policy influence is not necessary because of low extraction but since such influence is feasible, the easily implementable tools of fees, rewards or nudges are opted for. When subtractability is high and exclusion difficult (common pool resources), the least resistance is likely to be achieved with the entire mid-range of substantially controlling or non-controlling influences, including behavioral prods, disincentives, incentives and nudges. On one hand, the high subtractability of the resource requires some degree of policy influence and therefore excludes the possibility of applying no influences or fully non-controlling influences. On the other hand, the natural difficulty of excluding beneficiaries prevents the application of fully or substantially controlling influences.

How does the proposed distribution of policy influences correspond with reality? The principle of least resistance underlying the placement of policy influences in Table 2 can be observed in the governance of environmental resources: individual liberties in parks (public goods) are usually not influenced at all or at most influenced with rational persuasion; individual liberties relating to ownership (private goods) are protected with choice elimination, compulsion and coercion; and individual liberties pertaining to crossing a bridge or driving on a road (toll goods) are regulated with fees. In the case of common pool resources Elinor Ostrom (1990, 2005) has shown that a mixture of influences that follow the principles described in Section 3.2 has been observed historically in sustainable governance of common pool resources. However, a less recognized aspect of the influences at play in over-generational management of common pool resources is that they also rely on the type 1 processes of nudging and behavioral prodding which, according to the principle of least resistance, are among the most appropriate policy influences for this type of resource. I will illustrate this with case examples in Section 3.4.

In sum, applying the typology of behavioral influences to different types of environmental governance indicates that unconscious behavioral influences are likely to be widespread in the governance of common pool resources. Given the mixture of influences at play in common pool resource governance, Saghai's typology is useful in a coarse assessment of the type and degree of influence on individual decision making – with the caveat described in Section 3.1 concerning the blurred distinction between nudges and behavioral prods. Yet matching the typologies of behavioral influences and resources provide only an overall view of the location, type and extent of unconscious behavioral influences in environmental governance. For a more detailed picture, we must turn to the processes by which behavioral influences emerge in the specific practices and mental constructs of natural resource governance.

3.4 Behavioral influences embedded in the practices of environmental governance

To illustrate the embeddedness of unconscious behavioral influences in the governance practices of common pool resources, I will use two cases: reindeer management in Northern Fennoscandia and irrigation management in Spain. Both cases reflect the principles of sustainable resource governance, but in ways that are only implicit – that is, they are embedded in the practices of the livelihood. In the following my approach is to highlight how the practices observed in the two cases reflect the Ostromian principles of sustainable governance of resource utilization outlined in Section 3.2.

Despite significant contextual differences in the governance of reindeer management in Northern Fennoscandia (Forbes et al., 2006), all variations of the livelihood display considerable stability in maintaining the same practice of the livelihood's core function – earmarking. In order to publicly identify the living capital of a reindeer owner, reindeer calves are earmarked manually with a knife

(Beach 2007; Hukkinen, 2014; Konstantinov 2000). The practice secures the social-ecological sustainability of the livelihood, because it is adjusted to the annual ecological cycle of herd movements and maintains the cultural integrity of the herding communities (Forbes et al., 2006; Hukkinen, 2008). Surprisingly, electronic tagging, which is widely used with cattle, has not been adopted with reindeer.

My earlier work on the primary metaphors underlying the practice of manual earmarking points to a tentative explanation for the absence of electronic tagging. The practice of reindeer calf marking tightly integrates several primary metaphors (Section 3.1), such as ‘The purpose of governance is a destination’, ‘Progress in governance is a travel schedule’ and ‘States of the social-ecological system are physical locations along a path’. When integrated conceptually, the primary metaphors describe an event structure metaphor: ‘The governance of a social-ecological system is a journey’. The journey has very specific steps along a path during which the recently born calves are transformed from unmarked to marked property inside the calf marking fence. Manual cutting requires unique sensorimotor skills that are difficult for outsiders to learn and, as a result, build up a sense of community because they have to be passed on from senior to junior members of the herder family. Electronic tagging fails these tightly integrated steps of the journey, because it can be done by anybody and thus makes the boundaries of the community permeable (Hukkinen, 2014).

The practices of earmarking follow the principles of sustainable resource governance (Section 3.2), although they have not been formally stipulated in any management rules. Instead, they are embodied in the practices of reindeer management, executing themselves in the form of subtle, unconscious, type 1 behavioral influences. The boundaries of the resource and its users, for example, are effectively defined by the practice of manual earmarking, because earmarking marks not just the calf but also its owner. The skill required to make use of an earmarking knife at the

appropriate place and time controls access to the community of reindeer owners. In contrast, anybody could mark a calf with an electronic tag. Earmarking with a knife also facilitates congruence between rules and local conditions, because it can only take place at the last stages of a very complex technical procedure of calf marking, which involves controlling herd movements with all-terrain vehicles and fences, and separating calves from their mothers. The sequence of these sensorimotor activities is tightly coupled with the ecological characteristics of the calf marking site. Thus, the unique sensorimotor skill requirements not only define boundaries, but also serve to integrate the broader social-ecological system of reindeer management. Finally, manual earmarking facilitates effective monitoring, because publicly visible cutting of a calf's ear by a junior reindeer owner supervised by a senior one signifies to everyone present that a particular family of reindeer owners is present in the calf marking event and that the sensorimotor skill of marking is being passed on from one generation to the next. Electronic tagging would not enable such implicit monitoring (Hukkinen, 2014).

Similar processes can be identified in Elinor Ostrom's classic synthesis of the governance of ancient irrigation systems in southern Spain. Ostrom's analysis is based on studies from the 1970s and 1980s and juxtaposes three geographically proximate but substantially different systems of water allocation (Ostrom, 1990). Alicante organizes a weekly auction where farmers can purchase time allotments of water from the dam. In Valencia, each farmer can take as much water as they can use in a defined order. In Murcia and Orihuela, the time that irrigators can keep their water gates open is rationed. When framed in this way, the three systems appear to be economic instruments (Alicante) and command-and-control measures (Valencia, Murcia and Orihuela), which from the cognitive perspective are grounded in type 2 calculative processes of the rational mind. They exemplify Ostrom's idea that a mixture of policy instruments is good for the long-term survival of a resource system.

Ostrom's careful description of the cases, however, reveals that there are unconscious, type 1 processes at work as well that ensure effective monitoring of the system. In Alicante, the auction is public so that everyone knows who bids for what price; in Valencia, everyone can see who takes how much water on their turn; and in Murcia and Orihuela, everyone can see how long each farmer is keeping their gate open. Now assume for a moment that modern information technology would have been introduced to these ancient systems, allowing blind auctions and anonymous water allocation. Opportunities for water grabbing would open up. As Ostrom notes, fully transparent auctions and 'everyone [...] watching everyone else' (Ostrom, 1990: 74) are important features guaranteeing the long-term sustainability of the systems. Transparency and observability constitute the type 1 policy influence that interpenetrates the type 2 economic and command-and-control instruments. The unconscious behavioral influence in the Valencia system, for example, is that in principle a farmer has the freedom to take up all the water on his turn but is reluctant to do so because the neighbors can see it and might retaliate on their priority turn; and in Alicante the influence is that a farmer's bidding behavior is observable by neighbors during a public auction and might be reciprocated in the next auction.

In sum, the unconscious behavioral influences are embedded in the practices of governance. A promising line of future research is therefore to uncover such practices and their underlying mental constructs, for example with reliance on practice theory and cognitive linguistics as I have done here. The reindeer and irrigation cases also highlight the blurred boundary between nudges and behavioral prods. Although the transparency that secures effective monitoring is avoidable in principle (suggesting nudging), it is hard to imagine how an individual herder or farmer could easily avoid the forms of peer pressure that they are exposed to in practice (suggesting behavioral prodding). Since social practices are always coupled with specific local situations, determining the

acceptable boundary between nudges and behavioral prods remains a task for case by case deliberation among those involved.

4. Discussion and conclusion

Since unconscious behavioral influences are everywhere in social-ecological systems, the debate over whether or not to nudge in policy is beside the point. The more relevant question is: How do the nudges and behavioral prods that thoroughly permeate our social and material environment influence our behavior? The question is particularly relevant for the governance of environmental and natural resources, where the principles of good governance involve intensive social interaction among stakeholders through participation and deliberation – processes known to be laden with unconscious behavioral influences.

Analysis of behavioral influences demands appropriate analytical frameworks. As I have argued above, two frameworks appear particularly useful in light of earlier critiques of nudging. First, to determine the type and degree of behavioral influence, a typology based on the degree of control of individual behavior is instructive. Second, to reveal where and how behavioral influences are embedded in environmental governance, practice theory combined with cognitive linguistics appears promising.

These conclusions have implications for contemporary environmental issues such as the debate over the future of global climate governance. After the disappointments in expanding and continuing the Kyoto protocol approach, policy discussions preceding the Paris 2015 conference are beginning to revolve around a more decentralized approach to global climate governance. The reasoning is predicated on nudging. Large emitting countries are less inclined to participate in international

agreements for fear of reputational damage in case they fail to meet the commitments. But if allowed to determine their own contributions, the perceived absence of potential reputational damage is likely to persuade the countries to pledge more ambitious commitments (Stern, 2014). However, for the more decentralized approach to have the intended behavioral impact and actually reduce emissions globally, a better understanding is needed of the unconscious behavioral influences built into the practices of climate change mitigation and adaptation in specific national and local contexts.

The analytical approaches I have proposed in no way remove the ethical, social and cultural concerns over unconscious influences in environmental governance. The distinction between nudges and behavioral prods, for example, will inevitably remain a blurred one. Such ambiguity, however, provides all the more reason to reveal and better understand the unconscious mechanisms of influence in environmental governance. Analytical capabilities can open up the unconscious environmental influences – both intentional and unintentional – to public scrutiny. They are a prerequisite for the vigilant deliberative questioning of the ethical, social and cultural dimensions of behavioral governance demanded by earlier analysts.

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References

Amir, O., Lobel, O. 2008. 'Stumble, predict, nudge: How behavioral economics informs law and policy'. *Columbia Law Review* **108**: 2098-2139.

Aronson, E. 2012 [1972]. *The Social Animal, Eleventh Edition*. New York, NY: Worth Publishers.

Arthur, W.B. 2009. *The Nature of Technology*. New York, NY: Free Press.

Beach, H. 2007. 'Reindeer Ears: calf marking during the contemporary era of extensive herding in Swedish Saamiland.' *Annales Societatis Litterarum Humaniorum Regiae Upsaliensis*, pp. 91-118.

[Online] URL: <http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-134479>

Bermúdez, J.L. 2010. *Cognitive Science: An Introduction to the Science of the Mind*. Cambridge: Cambridge University Press.

Bovens, L. 2010. 'Nudges and cultural variance: A note on Selinger and Whyte'. *Knowledge, Technology & Policy* **23**: 483–486.

Bowker, G.C., Star, S.L. 1999. *Sorting Things Out: Classification and Its Consequences*. Cambridge, MA: MIT Press.

Cialdini, R.B. 2009. *Influence: The Psychology of Persuasion*. New York, NY: Harper Collins.

Clark, A. 2011. *Supersizing the Mind: Embodiment, Action, and Cognitive Extension*. Oxford: Oxford University Press.

Damasio, A. 1994. *Descartes' Error: Emotion, Reason and the Human Brain*. London: Vintage.

Dennett, D.C. 1991. *Consciousness Explained*. Boston, MA: Little Brown.

Dobson, A. 2011. *Sustainability Citizenship*. Dorset: Green House. [online] URL:

<http://www.greenhousethinktank.org/page.php?pageid=publications>

Earls, M. 2009. *Herd: How to Change Mass Behaviour by Harnessing Our True Nature*. West Sussex: Wiley.

Evans, J.St.B.T. 2008. 'Dual-processing accounts of reasoning, judgment, and social cognition'.

Annual Review of Psychology **59**: 255–278.

Fauconnier, G., Turner, M. 1998. 'Conceptual integration networks'. *Cognitive Science* **22**(2): 133-187.

Fauconnier, G., Turner, M. 2002. *The Way We Think: Conceptual Blending and the Mind's Hidden Complexities*. New York, NY: Basic Books.

Feldman, J.A. 2006. *From Molecule to Metaphor: A Neural Theory of Language*. Cambridge, MA: MIT Press.

Forbes, B.C., Bölter, M., Müller-Wille, L., Hukkinen, J., Müller, F., Gunsley, N., Konstantinov, Y. (eds) 2006. *Reindeer Management in Northernmost Europe: Linking Practical and Scientific*

Knowledge in Social-Ecological Systems. Ecological Studies 184, Berlin Heidelberg: Springer-Verlag.

Furedi, F. 2011. *On Tolerance: A Defence of Moral Independence*. London: Bloomsbury Publishing.

Grady, J. 2005. 'Primary metaphors as inputs to conceptual integration'. *Journal of Pragmatics* **37**: 1595–1614.

Hausman, D.M., Welch, B. 2010. 'Debate: To Nudge or Not to Nudge'. *The Journal of Political Philosophy* **18**(1): 123–136.

Hukkinen, J. 2008. *Sustainability Networks: Cognitive Tools for Expert Collaboration in Social-Ecological Systems*. London: Routledge.

Hukkinen, J.I. 2012. 'Fit in the body: Matching embodied cognition with social-ecological systems'. *Ecology and Society* **17**(4): 30. [online] URL: <http://www.ecologyandsociety.org/vol17/iss4/art30/>

Hukkinen, J.I. 2014. 'Model of the social-ecological system depends on model of the mind: Contrasting information-processing and embodied views of cognition'. *Ecological Economics* **99**: 100-109.

Hutchins, E. 2005. 'Material anchors for conceptual blends'. *Journal of Pragmatics* **37**: 1555-1577.

John, P., Cotterill, S., Moseley, A., Richardson, L., Smith, G., Stoker, G., Wales, C. 2011. *Nudge, Nudge, Think, Think: Experimenting with Ways to Change Civic Behaviour*. London: Bloomsbury Academic.

Jones, R., Pykett, J., Whitehead, M. 2013. *Changing Behaviours: On the Rise of the Psychological State*. Cheltenham: Edward Elgar.

Kahneman, D. 2011. *Thinking, Fast and Slow*. London: Penguin.

Konstantinov, Y. 2000. 'Pre-Soviet pasts of reindeer-herding collectives: Ethnographies of transition in Murmansk region'. *Acta Borealia: A Nordic Journal of Circumpolar Societies* **17**: 49-64.

Lakoff, G., Johnson, M. 1980. *Metaphors We Live By*. Chicago: University of Chicago Press.

Lakoff, G., Johnson, M. 1999. *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought*. New York, NY: Basic Books.

Ostrom, E. 1990. *Governing the Commons: the Evolution of Institutions for Collective Action*. Cambridge, MA: Cambridge University Press.

Ostrom, E. 2005. *Understanding Institutional Diversity*. Princeton: Princeton University Press.

Raihani, N.J. 2013. 'Nudge politics: Efficacy and ethics'. *Frontiers in Psychology* **4**: 1-3.

- Robbins, P., Aydede, M. (Eds.) 2009. *The Cambridge Handbook of Situated Cognition*. Cambridge: Cambridge University Press.
- Saghai, Y. 2013. 'Salvaging the concept of nudge'. *Journal of Medical Ethics* **39**: 487–493.
- Schatzki, T.R., Knorr Cetina, K., von Savigny, E. 2001. *The Practice Turn in Contemporary Theory*. London: Routledge.
- Selinger, E., Whyte, K. 2011. 'Is there a right way to nudge? The practice and ethics of choice architecture'. *Sociology Compass* **5**(10): 923–935.
- Shapiro, L. 2011. *Embodied Cognition*. London and New York: Routledge.
- Shove, E., Pantzar, M., Watson, M. 2012. *The Dynamics of Social Practice: Everyday Life and How It Changes*. London: Sage.
- Simon, H.A. 1996. *The Sciences of the Artificial, third ed.* Cambridge, MA: MIT Press.
- Stern, N. 2014. *Growth, climate and collaboration: towards agreement in Paris 2015*. Policy paper, December. London: Centre for Climate Change Economics and Policy, Grantham Research Institute on Climate Change and the Environment. [Online] URL: <http://www.cccep.ac.uk/Publications/Policy/docs/Growth-Climate-and-Collaboration-Stern-2014.pdf>

Thaler, R. H., Sunstein, C. R. 2008. *Nudge: Improving Decisions About Health, Wealth, and Happiness*. New Haven & London, UK: Yale University Press.

Thelen, E. 2000. 'Grounded in the world: developmental origins of the embodied mind'. *Infancy* 1(1): 3–28.

White, M.D. 2013. *The Manipulation of Choice: Ethics and Libertarian Paternalism*. New York, NY: Palgrave Macmillan.

Wilkinson, T.M. 2013. 'Nudging and manipulation'. *Political Studies* 61: 341-355.

Zajonc, R.B. 1980. 'Feeling and thinking: preferences need no inferences'. *American Psychologist* 35(2): 151–175.

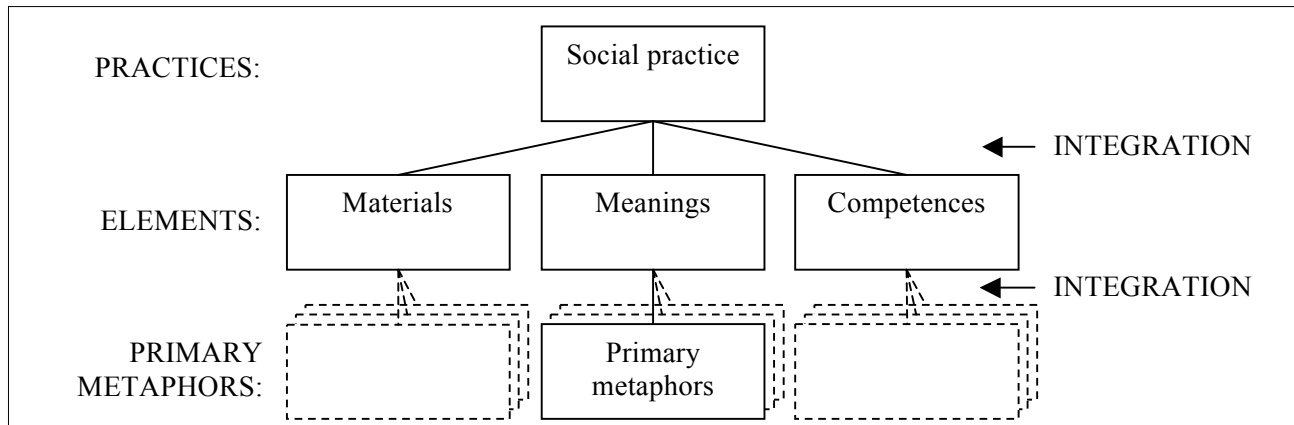


Figure 1. Conceptual integration of primary metaphors and practices

Table 1. Taxonomy of policy influences (adapted from Saghai, 2013: 492).

Type of influence	Degree of control	Definition
Choice elimination, compulsion, coercion	Fully controlling	Influencer preemptively removes the possibility to act from influencee's choice set; influencer uses physical force or threat to get influencee to act
Behavioral prod	Substantially controlling	Influencer makes it more likely that influencee will act by triggering influencee's shallow cognitive processes, while influencee preserve's influencee's choice set but is substantially controlling
Disincentives and incentives	Substantially controlling or non-controlling	Influencer increases the probability of getting influencee not to act/to act by attaching costs/benefits to acting
Nudge	Substantially non-controlling	Influencer makes it more likely that influencee will act by triggering influencee's shallow cognitive processes, while influencee preserves influencee's choice set and is substantially non-controlling
Rational persuasion	Fully non-controlling	Influencer induces influencee to act by presenting reasons to act

Table 2. Matching resource uses and policy influences.

Difficulty of excluding beneficiaries	Subtractability of use	
	Low	High
Low	TOLL GOODS: substantial control or non-control of choice with disincentives, incentives, or nudges	PRIVATE GOODS: control with choice elimination, compulsion, coercion
High	PUBLIC GOODS: non-control with rational persuasion	COMMON POOL RESOURCES: substantial control or non-control of choice with behavioral prods, disincentives, incentives, or nudges