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Appendix: Understanding Power in Sustainability Science

Alicia G. Harley

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In response to the increasing awareness that maldistributions of power reinforce unsustainable development pathways, more and more scholarship in sustainability science is seriously grappling with power. However, this literature remains disjointed—failing to either build on itself or converge around a common theoretical language with which to discuss the mechanisms of power ([Gerlak et al. 2019](#)). Having reviewed core political and sociological approaches to the study of power (e.g., [Dahl 2007](#); [Bachrach and Baratz 1970](#); [Lukes 1974](#); [Foucault 1979](#); [Haugaard 2002](#)) as well as contemporary approaches to power in sustainability science literature (e.g., [Clement 2009](#); [Avelino and Wittmayer 2015](#); [Boonstra 2016](#); [Avelino 2017](#); [Brisbois, Morris, and de Loë 2019](#); [Kashwan et al. 2019](#)) we believe that future work in sustainability science would be well served to build on an adaptation of the three-dimensional view of power first articulated by Steven Lukes ([Lukes 1974](#)). We selected Lukes' approach both because it is one of the citations most frequently used to conceptualize the mechanisms of power in empirical work, and because by articulating power's relationship between actors, resources, institutions, and goals, the three-dimensions of compulsion, exclusion, and influence complement the Framework for Sustainability Science.

Of course, the literature on power is replete with many useful perspectives. Many scholars use the terms 'decision-making', 'non-decision making' and 'ideological' to refer to the 1st 2nd and 3rd dimensions of power respectively. We find that these terms are less useful than the labels we have chosen. We prefer compulsion, exclusion, and influence because they convey the mechanisms through which each of the dimensions of power operate. By clearly articulating the mechanisms of power, these definitions help agitators articulate strategies of empowerment ([Gaventa 1980](#)). Another useful perspective on power emphasizes relational power and the dynamics of synergy, antagonism, and neutrality that emerge when different actors possess different kinds of power in relation to one another ([Avelino 2017](#)).

First dimension of power: <i>Compulsion</i>	<p>Actor A has power over actor B to the extent that he can compel B to do something that B would not otherwise do. This dimension of power is derived from ownership of or access to natural and anthropogenic resource and/or flows of benefits from those resources. For example, the ability of colonial governments to extract vast quantities of resources and labor from others was predicated on military and economic power derived from control over resources (Mann 2012).</p>
Second dimension of power: <i>Exclusion</i>	<p>Actor A has power over actor B to the extent that A can exclude B from decision-making arenas and restructure rules and norms to further A's own interests. This dimension of power is derived from the ability to shape institutional structures including rules and norms. For example, the ability of Canadian energy interests to block collaborative governance efforts to protect local common pool resources was predicated on their ability to limit the scope of negotiations and eliminate from consideration potential outcomes that would negatively impact the interests of industry (Brisbois, Morris, and de Loë 2019).</p>
Third dimension of power: <i>Influence</i>	<p>Actor A has power over actor B to the extent that A can influence or shape B's aspirations and beliefs. This dimension of power is derived from the ability of actors to influence the goals, aspirations, values, and even knowledge systems that privilege the well-being of some actors over others. The third dimension of power often prevents observable conflict from arising. For example, the ability of powerful corporations to stymie efforts to regulate greenhouse gases and toxic chemicals is predicated on their ability influence public beliefs about the threats (or lack thereof) posed by climate change and pollution (Michaels 2020).</p>

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