Sociological Forum

Sociological Forum, Vol. 38, No. 2, June 2023
DOI: 10.1111/socf.12885

Climate Solidarity: A Framework and Research Agenda for Low-Carbon Behavior[1]

Giacomo Bazzani[2]

Climate-change mitigation is a matter of solidarity. Behaviors that primarily benefit other people are prosocial behaviors that can be considered solidarity at the collective level. For climate-change mitigation, greenhouse gas emissions have to be reduced primarily in wealthy countries, while the major beneficiaries of such a reduction are the populations of developing countries and future generations, who (will) suffer the significant negative consequences of climate change. Climate change has created a new global interdependence that requires a new form of solidarity as a global and intergenerational prosocial behavior. Low-carbon behavior has so far mainly been studied as a form of pro-environmental behavior but not as a form of prosocial behavior. The article identifies four approaches to explaining the origin of prosocial behavior that can be applied to the emergence of low-carbon behavior: rationalist, institutionalist, interactionist, and situational approaches. The scope conditions and limitations of each approach in the case of low-carbon behavior are discussed, together with relevant empirical evidence, future research directions, and policy implications. The article lays the foundations for the study of climate solidarity as a new interdisciplinary field of research that can make a key contribution to the transition toward low-carbon societies.

KEYWORDS: climate change; global warming; low-carbon behavior; prosocial behavior; solidarity; sustainability transition.

INTRODUCTION

The transition to a climate-neutral society is an urgent global challenge that necessitates stringent emission reductions in all societal sectors. Current climate-change mitigation policies are not consistent with the goals set in the Paris Agreement to limit the temperature increase to well below 2°C and pursue efforts to keep it at 1.5°C above pre-industrial levels (Höhne et al. 2020; UNEP 2019; UNFCCC 2015). Reaching this goal requires moving beyond supply-side mitigation policies to (1) remove greenhouse gas (GHG) from the atmosphere and (2) rapidly increase demand-side mitigation (Millar et al. 2017; Rogelj et al. 2015; Sanderson et al. 2016; Wynes and Nicholas 2017). Demand-side mitigation is a vital part of the climate policy agenda (Aune et al. 2016; Geels et al. 2018), for which changing household consumption and personal lifestyles toward low-carbon behaviors is essential (Dubois et al. 2019; Moberg et al. 2019; Stern and Dietz 2020).

Household GHG emissions produce 72% of global emissions, including a significant proportion in the areas of mobility, housing, meat/fish consumption, and

[1] Open Access Funding provided by Universita degli Studi di Firenze within the CRUI-CARE Agreement.
[2] Department of Social and Political Sciences, University of Florence, via Pandette 32, 50127 Florence, Italy; e-mail: giacomo.bazzani@unifi.it

waste (Dietz 2014; Hertwich and Peters 2009; IPCC 2014). Van de Ven et al. (2018) showed that modest to rigorous behavioral change could reduce emissions per capita by 6%–16% and would contribute to lowering the costs of achieving the internationally agreed climate goal of the EU by 13.5%–30%. Modifying household behaviors to curb household emissions is essential and has great potential for reaching the 1.5°C target (Levesque et al. 2019; Moran et al. 2020; Rabkin and Gershon 2007). However, current policies and research only address this issue to a limited extent, mainly considering technological and economic aspects, but "overlook[ing] the behavioral, cultural, and social factors that affect theoretical and practical mitigation pathways" (Nielsen et al. 2020:325). Harnessing the mitigation potential on the demand side requires further knowledge from the social sciences and humanities (SSH) on how to accelerate household climate-change mitigation (Allen et al. 2015; Bouman and Steg 2019; Jorgenson 2018; Lorenzoni and Pidgeon 2006; Moberg et al. 2019; Steg et al. 2021).

A major limitation of the current understanding of low-carbon behaviors developed within SSH is that little consideration has been given to the motivations for and beneficiaries of such behaviors. SSH literature on climate-change mitigation mostly relies on the environmental paradigm examining the need for humans to care for and conserve nature, thus considering low-carbon behavior a form of pro-environmental behavior (Dietz 2016; Jorgenson 2018; Perlaviciute et al. 2021; Steg et al. 2014). Nature conservation is an essential feature of the sustainability paradigm that informs climate-change mitigation. However, the idea of climate sustainability refers to delivering on the needs of current generations while safeguarding the means to satisfy those of future ones (Adloff and Neckel 2019; WCED 1987:41). The 1992 Rio Declaration already clarified that the concept of "needs" refers in particular to the essential needs of the "world's poor," to whom, it argued, "overriding priority should be given"; accordingly, limitations should be imposed to maintain "the environment's ability to meet present and future needs" (WCED 1987:41). Thus, climate sustainability aims at the conservation of natural resources, although the final end is related to human needs. Nature conservation and the satisfaction of human needs are complementary rather than competitive ends, but the latter has received scarce attention as a driver of low-carbon behaviors. The study of low-carbon behaviors should regard both humans and nature as beneficiaries because the former's motivations and capacity for influence can have varying salience.

Moreover, pro-human motivation is particularly fascinating for sociology because it is a case of global and intergenerational solidarity (Alexander 2006; Bazzani 2021; Calhoun 2002; Smith and Sorrell 2014). Indeed, for climate-change mitigation, GHG emissions must, at this time, be reduced primarily by wealthy countries. However, the major beneficiaries of such reductions are not the current population of wealthy countries but their descendants and, to a greater extent, the populations of developing countries and their descendants, who (will) suffer the significant negative consequences of climate change ("a double inequality," Barrett 2013:1819). When behaviors involve costs for the self and mainly benefit other people, they constitute prosocial behaviors, which can be considered solidarity at the collective level (Wittek and Bekkers 2015:579). Thus, we propose a framework for the study of low-carbon behaviors as a form of global and intergenerational prosocial behavior, contributing to the development of a greater understanding of their

origin and the strengthening of climate-change mitigation strategies. In line with the need to examine the sociological micro-foundations of solidarity (Hitlin 2014; Lindenberg et al. 2006), this framework integrates well-established sociological theories that aim to explain the development of prosocial behavior with more recent research on low-carbon behaviors from sociology and related disciplines that can highlight some mechanisms behind the emergence of this type of solidarity.

In the next section, prosocial behavior and solidarity are defined. Then, we show that contemporary global challenges require a new type of solidarity (altruism) that is different from the modern solidarity developed within nation-states (mutualism). The central part of the article discusses the main approaches that aim to explain the emergence of prosocial behavior (i.e., rationalist, institutionalist, interactionist, and situational approaches) and their application to the case of low-carbon behaviors. After a brief introduction, we examine the scope conditions and limitations of each approach in the case of low-carbon behaviors and present empirical evidence of their capacity to support such behaviors. The conclusions highlight some common research aims of climate-solidarity research and the types of contribution that can be made at the different policy levels involved in climate-change mitigation.

WHAT IS SOLIDARITY?

The notion of solidarity is one of the most obvious in terms of common sense but also one of the most controversial in scientific research. In general, solidarity is described as any kind of bond that holds a group or community together and usually involves a form of belonging through the identification of oneself as part of the group (Foote 1951; Hunt and Benford 2004; Scholz 2008; Smith and Sorrell 2014). However, this kind of definition does not precisely qualify solidarity in relation to other social processes (Bayertz 1999). For example, some types of group membership involving strong identity ties do not necessarily lead to acts of solidarity among members. Therefore, in addition to a sense of belonging, Lindenberg (1998) argues that solidarity can be observed only through solidarity-oriented behavior (i.e., prosocial behavior).[3] Although this definition does not account for all the possible meanings of the term and origins of solidarity, it makes it easier to distinguish solidarity from other social processes (Smith and Sorrell 2014; Wittek and Bekkers 2015), thus furthering the aim of improving our understanding of the emergence of low-carbon behaviors.

The distinctive feature of prosocial behavior is that it entails costs for *ego* and benefits for *alter* (Wittek and Bekkers 2015). This definition differentiates between two types of prosocial behavior: (1) *mutualism*, which results in benefits for *ego* as well, and (2) *altruism*, in which the costs for *ego* are higher than the benefits or there are no benefits for *ego* (Bowles and Gintis 2011). Moreover, prosocial behavior can be *direct* in dyadic and group interactions or *indirect* when mediated by institutions or third parties.

Some authors emphasize the role of the *motivations* underlying prosocial behavior as a specific feature of solidarity (Bayertz 1999; Bazzani 2020; De Beer and Koster 2009). Indeed, some behaviors benefit *alter* irrespective of a clear intention of

[3] May (1996:44) suggests that solidarity also requires each member of the group to feel that the well-being of the group is part of his/her own well-being.

ego. In this view, the motivations behind prosocial behavior should be clearly oriented toward the well-being of others. Motivations make it possible to distinguish between *pure altruism*, which is primarily/only motivated by the well-being of *alter*, and *impure altruism*, which is also motivated by self-interest (Piliavin and Charng 1990).

Climate mitigation is a case of prosocial behavior because although the costs of emissions reductions are incurred mostly by the present generation living in wealthy countries, the expected major beneficiaries are the current populations of developing countries (Althor et al. 2016) and future generations, who (will) suffer the worst consequences of climate change. Considering the motivations associated with this prosocial behavior, we can distinguish between pure altruism motivated by the welfare of current and future generations in developing countries, a more restricted concern for the welfare of one's children and grandchildren, and self-interest in which adopting a sustainable lifestyle serves as a strategy to preserve the culture of consumption in wealthy countries.[4]

FROM MODERN SOLIDARITY TO CLIMATE SOLIDARITY

Individual motivations are a feature of solidarity, but the origin of solidarity cannot be reduced to them. Durkheim elaborated the most famous theory seeking to explain the emergence of modern solidarity, focusing on the "structural" characteristics of society. As urbanization, industrialization, and technological progress dissolved traditional pre-modern community ties, the new labor division in society created a new interdependence among individuals (Durkheim 1893/1964). In Durkheim's perspective, the modern labor division should also foster new awareness among citizens: observing that their own well-being also depends on the well-being of others, they should be motivated to adopt prosocial behavior in the higher interest of maintaining society (Durkheim 1893/1964; Scholz 2008). Thus, individual motivations for prosocial behaviors are an outcome of labor interdependence. However, this classical explanation of the emergence of solidarity shared by Durkheim and Parsons is limited because it mainly focuses on "*socialization* in which norms are internalized, and prosocial personalities are formed," but the authors' answers "were not quite satisfactory because they failed to explain the influence [that] changing situations" can have on solidarity (Lindenberg et al. 2006:4; see also Gottfredson and Hirschi 1990; Hoffmann 1983). While labor interdependence is the precondition for solidarity, the emergence of prosocial behavior depends on a wide range of contingent factors that cannot be reduced to socialization. In this sense, Hitlin highlights the need to focus on "micro-level" processes to better understand the mechanisms that allow solidarity to develop (Hitlin 2014:195; see also Smith and Sorrell 2014).

Modern solidarity has been sustained by the organization of modern nation-states around a bureaucratic, military, and police apparatus over the territory, as well as the centralization of political power and the taxation system. These apparatuses contributed to enhancing interdependence among individuals but also created the basis for solidarity. Modern solidarity reached its full development with the

[4] I thank two anonymous reviewers for suggesting this distinction.

progressive affirmation of civil, political, and social rights, together with the expansion of educational, health, and social services available to citizens. While direct solidarity took place in small communities in traditional societies, modern state solidarity led to the prevalence of *mutualist* indirect solidarity: citizens contribute via taxes to the state apparatus that should ensure the well-being of everyone (Brunkhorst 2005; Durkheim 1893/1964).

Brunkhorst (2005) argues that the solidarity that developed within nation-states has been effective in addressing three major historical challenges that are now re-emerging at the global level. First, nation-states have internalized the management of religious affairs, reducing large-scale religious conflicts since the Peace of Westphalia (1648). Second, the introduction of constitutions and political rights has largely prevented the outbreak of political revolutions and internal conflicts. The political systems of modern states have renewed and adapted themselves to new power groups without violent revolutions, thus surviving both socialism and capitalism. This flexibility has also been effective in managing a third major challenge: dealing with the discontent caused by uncertainty and socioeconomic injustice. In the capitalist context, the state created the preconditions for the functioning of the market and free individual initiative, but it has also committed itself to reducing inequalities through taxation and the provision of public services (Brunkhorst 2005, 2007).

The modern solidarity that developed within nation-states seems ineffective in coping with recent global challenges. For example, large-scale migration, the sustainable use of natural resources, and the spread of diseases are major challenges of our time that create wide interdependence and can be solved neither by single individuals nor by single nation-states but require coordinated solutions (Alexander 2006; Calhoun 2002; Laitinen and Pessi 2014; Smith and Sorrell 2014). Moreover, the actions undertaken to deal with global challenges often constitute prosocial behaviors because they can benefit other actors, who may be distant in time and/or space. These behaviors can take the form of either *direct* prosocial behaviors (e.g., welcoming migrants can benefit the migrants themselves but also neighboring countries and the countries of origin via remittances) or *indirect* prosocial behaviors (e.g., donating money to medical research can benefit people far away in time and space).

Among these challenges, global warming clearly shows that a new type of solidarity that goes beyond that developed within modern states is needed. Global warming and the resulting climate change are a consequence of GHG emissions into the atmosphere, which are largely attributable to the use of fossil fuels (IPCC 2018). Although the richest 10% of the world's population is responsible for 52% of global GHG emissions, the effects of climate change fall outside the national borders of rich countries. Negative consequences currently affect developing countries that are minimally responsible for GHG emissions and will impact future generations significantly more strongly (IPCC 2018). The greatest negative effects of climate change are distant in place (developing countries) and time (future generations). Thus, climate change has created a new global interdependence that requires a new form of global solidarity capable of prioritizing the needs of "others"—namely, the population of developing countries and future generations (Bazzani 2021; Laitinen and Pessi 2014; Wilde 2013). Among prosocial

behaviors, this can become a form of altruism that diverges from the mutualism developed within modern nation-states. Although the beneficiaries of this altruistic solidarity are always other people, they can be divided into descendants of populations engaged in low-carbon behavior and other current populations and descendants. The boundaries of social identity can thus influence the development of these different types of solidarity (see the "Institutions" section).

The structure of nation-states does not seem prepared for this type of solidarity aimed at reducing GHG emissions. Rather, it risks encouraging a free-rider logic instead of international cooperation (Falkner 2016). Moreover, for some authors, global solidarity is challenging because solidarity is unlikely without group identification and strong group ties (Rorty 1989) or can result in competition with group solidarity (Alexander 2006; Calhoun 2002). Therefore, it is crucial to understand the micro-level processes that allow climate solidarity to emerge, supporting the development of new policies to reduce GHG emissions, such as the diffusion of "green" technologies and lifestyle changes toward low-carbon behaviors. Enhancing low-carbon behaviors is one of the most promising strategies for reducing carbon emissions, and SSH can make a valuable contribution in this regard. The next section draws on the main theories seeking to explain the emergence of prosocial behavior and discusses the scope of their validity for supporting low-carbon behavior.

THEORIES OF SOLIDARITY AND LOW-CARBON BEHAVIOR

Social sciences and humanities literature on low-carbon behavior mainly relies on a psychological-environmental paradigm that approaches low-carbon behavior as a form of pro-environmental behavior and ignores its prosocial dimension (Dietz 2016; Perlaviciute et al. 2021; Steg 2016; Steg et al. 2014). We argue that low-carbon behavior should be regarded not only as pro-environmental behavior, but also as a form of prosocial behavior. Until now, the two fields of prosocial and pro-environmental behavior studies developed mostly separately, albeit at the intersection of the same disciplines (i.e., sociology, psychology, political science, and, more recently, sustainability transition studies). In the following, we propose a framework for the study of low-carbon behavior, which brings together the existing knowledge about the origins of prosocial and pro-environmental behaviors.

Many theories try to explain the emergence of solidarity and prosocial behaviors. This field of study struggles to define itself clearly, also using the terms "cooperation," "collaboration," "social bond," "proximity," and "community" in a non-mutually exclusive way (Smith and Sorrell 2014). However, in line with Wittek and Bekkers (2015), we identify within this literature four different approaches to explaining the origins of prosocial behavior that can be fruitfully applied to low-carbon behavior: rationalist, institutionalist, interactionist, and situational approaches. The following interpretative analysis seeks to broaden our understanding of low-carbon behavior with a view to building a new framework of climate solidarity and formulating hypotheses for future testing or comparison.

Rational Choice

Rational choice theories generally rely on the assumption that individuals seek to maximize their gains. Consequently, they try to explain the conditions under which selfish individuals engage in prosocial behavior. The preference for following prosocial norms is conditional, and manipulating personal expectations causes major behavioral changes (Bicchieri 2005). Achieving shared goals such as climate mitigation requires repeated sequences of interactions and coordination capacity among different actors. In these situations, from a rational choice perspective, the main obstacle to prosocial behavior is trust since the beneficiary may not reciprocate (Wittek and Bekkers 2015:3). In this case, *alter* is a net beneficiary of *ego*'s action, while *ego* only suffers the costs; as a result, prosocial behavior is no longer advantageous for *ego*. To address this social dilemma, which can apply to climate mitigation, incentives and signaling are two useful strategies.

Incentives are rewards and punishments designed to encourage prosocial behavior (Lindenberg 1997), which can be formalized in laws and rules or associated with informal norms. Incentives are often used to encourage low-carbon behaviors (Kastner and Stern 2015; Steg and Vlek 2009). High costs can be an obstacle to low-carbon behaviors (Kastner and Stern 2015), whereas, on the contrary, economic incentives may encourage them (Bolderdijk et al. 2013; Maki et al. 2016). Moreover, GHG emissions reduction can also be achieved via the use of low-emission technology without the need for lifestyle changes, for example by incentivizing the use of electric vehicles or the adoption of low-impact energy-production systems (Korcaj et al. 2015).

Regardless of the use of incentives, the decision to trust *alter* entails a variable level of uncertainty about the latter's future behavior. *Signaling* is the assessment of the degree of trustworthiness of *alter* by identifying characteristics that can be indicators of his/her trustworthiness (Bacharach and Gambetta 2001; Malhotra and Keith Murnighan 2002; Molm et al. 2000). These signs do not eliminate the uncertainty involved in the trust relationship, but they are used by the truster to reduce his/her own uncertainty and guide decisions (Lindenberg 2003; Wittek 2003). Signaling is one of the less-studied mechanisms in low-carbon behaviors. There is evidence that low-carbon lifestyles such as the use of electric vehicles can signal *alter*'s engagement in low-carbon behavior, thus encouraging *ego* to trust in *alter*'s future low-carbon behavior (Noppers et al. 2014). However, this type of low-carbon behavior can also result from consumer choices that are not necessarily oriented toward climate solidarity. Future research can investigate the specific influence of prosocial orientation in these cases and the kinds of incentives and signals that are more effective in encouraging various types of low-carbon behaviors, whether they imply lifestyle changes or not. However, rational choice theories alone cannot explain the emergence and development of climate solidarity. Durkheim already noted that invoking a common interest is not sufficient to maintain solidarity and cope with the risk of anomie in modern societies (Bayertz 1999; Durkheim 1893/1964; Spillman 2012; Stjerno 2004). These risks are amplified in the case of low-carbon behavior because the main beneficiaries are often far removed in space and time, and *ego*

may not benefit from his/her prosocial behavior. The next paragraph discusses the role that institutions can play in supporting low-carbon behaviors.

Institutions

Taking distance from a functionalist view of society, Meyer et al. (1997) describe how the institutionalization of world models constitutes actorhood (i.e., the individuals' perceptions, judgments, and actions) and the similarities that flourish in world society. According to neo-institutionalism, institutions provide the cultural "script" shaping actors and operating as "framing assumptions" (Meyer et al. 1997:149). This view contrasts with the rational actor assumption because "people rely on mostly unarticulated mental images to make sense of the world and, moreover, work with a notion that others also think in similar images" (Alasuutari and Qadir 2016:635). Although the degree of (in)dependence of humans in performing institutional roles is debated (Douglas 1986; Patriotta 2020), institutions generate templates for acceptable behaviors that define the roles that individuals and organizations can legitimately pursue in a specific social context (Meyer 2010). Thus, institutional approaches emphasize the relevance of *formal rules*, *roles*, *norms*, and *values* for legitimating action and explaining the emergence of prosocial behavior. World culture theory underlines that globalization is a powerful driver of the spread of a common culture that creates rules and models for the functioning of society (Robertson 1992). Often, rules are not imposed by a single actor (individual, organization, or state) but arise from globally shared values. In this process, "states adopt similar norms, constitutions, principles, rules, and structures," which "implies changes for states, the system of states, individuals and humankind" (Joyeeta 2007:451). Compared with the rational choice perspective, this approach to the formation of rules and norms underplays the need for incentives and signs to promote prosocial behavior. Indeed, generally speaking, norm compliance in itself is a valuable feature of prosocial behavior, which makes the benefits of such behavior for *ego* less relevant. The underlying social mechanisms at the root of these rules, norms, and values usually refer to long-term social processes such as (1) learning and socialization, (2) shared social identities generating loyalty to the rules of the group (Ellemers et al. 2002), and (3) mechanisms associated with fundamental traits of human behavior, for instance reciprocity (Mauss 1923/1954; Wittek and Bekkers 2015).

In the context of climate mitigation, there is evidence that pro-environmental behavior and prosocial behavior appear meaningful and generate positive emotions that motivate action (Perlaviciute and Steg 2014; Venhoeven et al. 2020). Low-carbon behavior must be embedded in a narrative of informed choice linked to the long-term collective good, which enhances the positive view of the self (Marshall 2015). For instance, the emphasis on health and environmental benefits can inspire people to engage in low-emission behaviors more than the emphasis on their economic benefits (Bolderdijk et al. 2013; Schwartz et al. 2015). Personal *values* influence the individual propensity for low-carbon behaviors: the presence of strong values related to caring for others (altruistic) and the environment (biospheric) is associated with a greater disposition toward such behaviors (Perlaviciute et al.

2021:4). On the contrary, strong selfish and hedonistic values are an important obstacle to pro-environmental behavior (Steg 2016; Steg et al. 2014; Steg and de Groot 2012). However, altruistic values remain in the background of behavior and "affect environmental behavior mainly indirectly" (Steg 2016:80). This influence can be observed in the capacity of values to create conflicts between different orientations. Indeed, low-carbon behaviors are often "costly," notably in terms of time or money, but also represent the "right" thing to do; thus, selfish and hedonistic values conflict with biospheric values (Steg et al. 2014). This conflict can be partly solved by policies that make low-carbon behaviors profitable. Still, this strategy "provides an unreliable basis for sustained pro-environmental actions" (Steg et al. 2014:106) because of its dependence on incentives and the capacity to strengthen hedonistic and gain-related goals by relegating pro-climate goals to the background (Bolderdijk et al. 2013; Evans et al. 2013).

Furthermore, in contemporary societies, low-carbon behaviors are at the intersection of conflicting *norms* (Mcdonald et al. 2014; Schultz et al. 2007). Descriptive norms regarding low-carbon behaviors (i.e., what group members commonly *do*) often conflict with injunctive norms (i.e., what group members think *should be done*) (Cialdini and Goldstein 2004; Fielding and Louis 2020) or with "niche norms" in the context of a socio-technical transition process (Geels 2020:15; Ruhrort and Allert 2021:7). For instance, in suburban areas, people often use their cars even though they know that they *should* use public transport to reduce GHG emissions. In addition, people experience conflicts between different injunctive norms that can apply to the same situation. For instance, the norm of not using one's car for daily transport can clash with the role of symbolic recognition played by driving an SUV since, in wealthy countries, buying an SUV is often considered an expression of high social status (Gössling et al. 2020). These types of conflicts are not only a psychological condition and a cultural product within which conflicting values and norms coexist, but can also be related to the political-economic context. Norgaard (2011) discusses Norway's status as one of the world's richest countries and largest exporters of oil and natural gases; wealth created with and dependent on fossil fuels coexists in Norway with high levels of education and environmental values, generating particularly salient value and norm conflicts (Norgaard 2011).

Little is known so far about how values and norms shape people's choices regarding low-carbon behaviors. Future research should focus on disentangling the contribution of *compatible*, *competing*, and *conflicting* values and norms in multiple situations and at different levels of activation (Conte et al. 2021). This conflict experience requires a (new) judgment that increases the level of reflexivity in the course of action (Bazzani 2022a; Dewey 1930; Schultz et al. 2007). The conflict between norms is solved in an imaginative "dialogue" about competing "possible lines of action" because "deliberation is an experiment in finding out what the various lines of possible action are really like" (Dewey 1922/1930:190). In this situation, individuals can decide to opt for "traditional" high-emission behavior or, on the contrary, contribute to climate-change mitigation by becoming "vocal and active, e.g., by performing symbolic acts of consumption, which are shared in private interaction or on social media" (Ruhrort and Allert 2021:7). According to transition theory, this situation opens a window of opportunity for transformational change in the direction of

climate-change mitigation; it is a moment of intensified struggle between established structures and alternative options (Geels et al. 2018; Ruhrort and Allert 2021). The analysis of this imaginative dialogue over conflicting norms allows an investigation of what opportunities for increasing low-carbon behaviors people envisage in their lives (Bazzani 2022b, 2023; Seligman et al. 2013). Moreover, we need to understand how the values and norms related to climate-change mitigation are formed and vary across cultures and groups (Bardi and Goodwin 2011).

In addition, *social identity*, which refers to an individual's self-concept deriving from his/her membership in social groups (Turner et al. 1987), can influence the individual's interest in the well-being of other group members and, thus, his/her propensity for prosocial behavior (the "ingroup favoritism" pattern of behavior; Baldassarri and Grossman 2013; Tajfel and Turner 2004; Yamagishi and Kiyonari 2000). Therefore, individual propensity to engage in low-carbon behaviors oriented toward the well-being of people can be influenced by social identity. Following the ingroup favoritism pattern of behavior, it can be hypothesized that the propensity for low-carbon behavior should be higher when the beneficiaries are closer to an individual's social identity. Thus, if it is expected that the negative consequences of climate change will mainly affect descendants of populations engaged in low-carbon behavior or their country, the propensity for low-carbon behavior should be higher than when the negative consequences are mainly expected to be suffered by other countries and their descendants. Social identification at the local community, country, or world level is thus an essential feature that can influence the propensity for low-carbon behavior. Nonetheless, social identity can also change due to individual experiences or social change. In recent years, for instance, globalization has fostered international networks that provide individuals with information about events taking place in faraway places and the lifestyles of "global others" (Buchan et al. 2009), increasing the propensity for prosocial behaviors toward the latter (Grimalda et al. 2018, 2021). However, the role of social identities in fostering low-carbon behaviors receives little attention. Future research should analyze the influencing capacity of social identities in supporting low-carbon behavior, both via identification with the "world as a whole" and via loyalty to groups engaged in climate-change mitigation.

Institutional approaches face two main obstacles in explaining the emergence of low-carbon behavior. First, they cannot account for the variety of prosocial behaviors. In the case of low-carbon behavior, while a certain homogeneity of normative and value orientations is assumed in the same cultural context, we observe much diversity in low/high-carbon behaviors (Axsen and Kurani 2012; Sovacool et al. 2021). Second, the focus on cultural features such as norms and values, which are relatively stable over time and often across generations, makes the problem of solidarity difficult to address in the short run. Since norms and values are formed during socialization and then remain largely stable throughout life, they can only change through new educational plans for future generations (the "educationalization" risk; see Bamberg et al. 2021; Bridges 2008). This approach limits the role of solidarity and prosocial behavior to that of relatively stable background factors that cannot be modified in the short term to address urgent global challenges like climate change.

The next sections describe how more contingent conditions, such as the interactional and situational characteristics, can support prosocial and low-carbon behaviors.

Interactional Structures

Interactionist approaches aim to explain the emergence of solidarity by focusing on the type of interdependence that underlies prosocial behavior. Climate change shows that individual (low-)carbon behavior has far-reaching consequences for many other individuals: the sustainable use of the atmosphere is a type of social dilemma that can be identified as a "tragedy of the commons" (Hardin 1968). The use of common goods (i.e., GHG emissions) by individuals or single states generates a structural condition of interdependence in which the GHG emitters would benefit most from the massive use of the common good (the free-rider option). This reduces access to the common good for others or has harmful consequences for them (*negative interdependence*), as in the case of global warming.

While self-organization is feasible for the management of common goods held by small groups, such as the office fridge or fish in a lake (Ostrom et al. 1999), the free-rider option is facilitated in the case of large-scale common goods. Indeed, repeated interaction and direct communication in small groups both support compliance with group norms that facilitate cooperative behavior (Buskens and Raub 2013; Ellickson 1991) and allow the *social influence* mechanisms (e.g., via reputation) that can lead to the emergence of prosocial behavior (Ellwardt et al. 2012; Sommerfeld et al. 2007). The expanding scale of common goods complicates their management, and the free-rider option can appear more advantageous and seem to carry a lesser risk of negative sanctions. The actual capacity of nation-states to cooperate to reduce GHG emissions seems to be hampered by this type of structural problem (Brechin 2016; Falkner 2016).

Social influence can support low-carbon behavior. The influence of peers (Abrahamse and Steg 2013; Bouman et al. 2020) and neighborhoods (Axsen and Kurani 2012; Heiskanen et al. 2010, 2015), as well as families and companies (Fielding and Hornsey 2016; Jans et al. 2018), can motivate individuals to adopt low-carbon lifestyles. Experts and consultants also have a capacity for influence. For example, a car salesman may (or not) choose to disclose information about GHG emissions (Zarazua de Rubens et al. 2018). In addition, local initiatives for energy production from renewable sources can foster low-carbon behavior among individuals without previous interest (Sloot et al. 2018). Social influence can be a driver of lifestyle changes toward low-carbon behaviors. Thus, research should improve our understanding of the role played by the social network in choosing the different types of low-carbon behavior over the free-rider option.

Situational Characteristics

Situational approaches emphasize the role of situational features in encouraging/discouraging prosocial behavior (Fetchenhauer et al. 2006). The probability of observing prosocial behavior often varies across situations, even if social norms and

the expected self-interested behavior of individuals remain constant. For instance, *goal-framing theory* suggests that even small changes in the environment can have a subconscious effect that activates different interpretative framings of the situation, favoring, for instance, either hedonistic or altruistic-oriented behavior (Lindenberg 1998; Lindenberg and Steg 2007). Indeed, prosocial behavior is based on a normative orientation that values the well-being of others but may also appear to compete with one's interest as if these were two opposing interests. Thus, in each situation, different interpretative frameworks can be applied that may or may not generate prosocial behavior (Chong and Druckman 2007). Moreover, *socio-material approaches* emphasize the role of artifacts in orienting the course of action and encouraging prosocial behavior (Latour 1987). The "morality" of the action often lies more in the design of the artifacts and their "action programs" than in the intentionality of the user (Bijker 1993; Latour 1992). The functioning of the artifacts may thus unconsciously foster prosocial behavior or, in line with goal-framing theory, even enhance the salience of the normative frame (Marres 2015; Perlaviciute et al. 2021). A classic example of this approach is found in the analysis of how the technical characteristics of a water pump create the conditions for more or less prosocial behavior among users (De Laet and Mol 2000).

As we have already seen, low-carbon behaviors are often at the intersection of contrasting values and normative orientations. Although environmental values are widely endorsed by the population (Steg and de Groot 2012), they are not always associated with corresponding behaviors. Norgaard (2011) has shown that individuals experience a "double reality" between what they know about global warming and what they do in their everyday life. People generally do not reject information about the consequences of global warming, but they fail to integrate this knowledge into the common sense of their everyday life and to promote action to reduce carbon emissions ("implicatory denial"). A "social organization of denial" (Zerubavel 2002, 2006) is found in the cultural toolkit of "tools of order" and "tools of innocence" that are employed to create distance from direct responsibility and affirm a positive view of the self (Norgaard 2011). However, research can better investigate how a different framing of the beneficiaries of climate mitigation as descendants of populations engaged in low-carbon behavior, other populations, and their descendants can have varying effectiveness in supporting low-carbon behavior.

In the same vein, cognitive sciences reveal that the threats posed by global warming are often seen as distant from one's experience, which produces psychological obstacles to undertaking actions (Clayton and Manning 2018). This is reinforced by the innate tendency to select information that confirms one's beliefs (Corner et al. 2012). Emphasizing that climate change is happening here and now can help individuals recognize moments of proximity with one's experience and support a shift toward environmental/altruistic-oriented behavior (Marshall 2015). Cognitive dynamics suggest that the salience of one norm among conflicting options can be intensified by the frame used to describe the situation, thus contributing to individuals' (dis)engagement in low-carbon behaviors (Bain et al. 2012; Druckman and McGrath 2019). Existing research has produced some evidence for the "emphasis-framing effects" of highlighting particular purposes and benefits of climate-change mitigation on public opinion (Bain et al. 2012; Drews and Van den Bergh 2016;

Lakoff 2010). Nonetheless, the capacity of framing strategy to support relevant shifts in behaviors is debated (Bernauer and McGrath 2016; Fesenfeld et al. 2021).[5] Moreover, it remains unclear whether and how this framing strategy is effective in the context of low-carbon behaviors and, in particular, what capacity for influence the framing of low-carbon behaviors as prosocial behavior can have. In addition, contextual factors might affect the effectiveness of framing in altering people's opinions, but we currently lack comparative studies. Studies of the framing of environmental issues are mostly single cases (with some notable exceptions, e.g., Beiser-McGrath and Bernauer 2019; Bernauer and Gampfer 2015; Fesenfeld 2020; Whitmarsh et al. 2019) and are centered primarily on the United States (Aklin and Urpelainen 2013; Bain et al. 2012, 2016; Bernauer and McGrath 2016; Hardisty et al. 2010).

Socio-material characteristics can also become situational cues that encourage low-carbon behaviors (Bazzani 2019; Fox and Alldred 2020). For example, the design of packaging and the environments in which consumption takes place can foster the reduction of meat consumption (Tuomi and Tussyadiah 2020), and the use of green labels and environmentally friendly packaging can make a pro-environmental orientation more salient than the personal-gain frame (Agrawal and Lemos 2015; Evans et al. 2013; Hahnel et al. 2015). Consumer studies show that the need for choose "green" products can be seen as an individualized deployment of the precautionary principle and a consequence of a more general process of individualization of political conflicts (Guthman 2007). However, two possible outcomes are highlighted. On the one hand, delegating to consumers such collective decisions about our common future may induce political apathy, in which citizens reduce their claims for politics to safeguard the environment (Szasz 2007). On the other hand, even small acts of environmental protection can become more prosocial when they are influenced by contextual elements that focus attention on the common fate and collective responsibility for environmental problems (Rudel 2013). However, choosing the "right" green label among different options is not easy and can constitute a new burden, requiring further information, skills, and time. Mackendrick (2018) shows the complexity of consumers' decisions to engage in the "precautionary consumption" of "green" products. In particular, middle-class women become aware of the importance of such choices during their transition to motherhood because the attribution of this responsibility and burden is gendered and culturally and socially determined.

Socio-material approaches can also be applied on an urban scale for the study of low-carbon behaviors, such as the functioning of smart cities (Luque-Ayala and Marvin 2019) or new energy infrastructure using renewable energies (Kuch 2015; Sareen 2021). Socio-material approaches have played a prominent role in the development of the sustainability transition research agenda (Geels 2020; Köhler et al. 2019), although interest in low-carbon behavior remains marginal. The study of socio-materiality can shed light on the complex intertwinements of low-carbon technological innovation, consumer practices, and prosocial consequences that can help

[5] Framing approaches must consider the risk of reactant effect. Eliciting values is effective among people who endorse them as guiding principles in their life decisions; on the contrary, prosocial framing strategies may have undesirable reactance effects on people who do not endorse altruistic values (Conte et al. 2021; Feinberg and Willer 2013; Grimalda et al. 2021).

improve their design. This perspective also has the capacity to create an interdisciplinary area of research with STEM disciplines that aim to reduce GHG emissions.

CONCLUSION

Social sciences and humanities can make a crucial contribution to understanding the social processes that can help reach climate neutrality. Global warming has created a new type of global interdependence, which requires multilevel coordinated action because no single individual, group, or state can cope with this challenge alone. A further complication is that action for climate-change mitigation must also be solidaristic: the main GHG emitters are wealthy countries, whereas most of the negative impact falls on developing countries and future generations. Thus, climate-change mitigation is also a problem of climate solidarity because it is a case of global and intergenerational prosocial behavior.

Climate solidarity is still a process in the making, and its institutions and instruments need to be further developed. Modern institutions once guaranteed, to some extent, solidarity within nation-states, but they are no longer capable of ensuring solidarity regarding global-scale challenges and climate issues, in particular. This new form of solidarity is different from the mutualism that developed within nation-states (Brunkhorst 2005; Durkheim 1893/1964) and closer to altruism because the expected benefits of climate-change mitigation will mainly be appreciated by future generations and some developing countries, while emissions have to be reduced primarily in wealthy countries.

This article proposes a framework that links the most important approaches aiming to explain the origin of solidarity with research on low-carbon behavior. The four approaches are not alternative theories but rather different perspectives belonging to different research traditions that seek to explain the origins of the same phenomenon. The proposed analysis of low-carbon behaviors does not cover all sociological research perspectives on climate mitigation, notably other macro-sociological explanations of global warming with which this analysis is not engaging. For instance, Schnaiberg's (1980) Treadmill of Production theory focuses on analyzing the globalization of production driven by the capitalist world economy, which results in a continual process of environmental degradation (Curran 2017; Islam and Hossain 2015). A more radical socio-ecology is offered by Foster's (2000) reading of the capitalist system and Marx's ecology. In his view, green theory fails to achieve a deeper understanding of ecological crisis due to its failure to overcome the false dichotomization of Man versus Nature; he proposes an ecologically oriented materialism instead.

The four approaches suggest different strategies for supporting the emergence of low-carbon behavior, which can be mutually reinforcing. For instance, the socialization strategy suggested by the institutional approach does not deny the potential of short-term incentives to promote a shift to low-carbon behavior proposed by the rational choice approach. In addition, the goal framing theory of the situational approach aims to elicit values that are already interiorized via the socialization process. Although each approach focuses on specific topics and research questions, at

least two common goals for this new field of study can be considered. First, comparative research is useful to assess the cross-country variance of strategies for increasing low-carbon behaviors (Dubois et al. 2019; Wilk 2002), especially for deeply embedded cultural consumption habits, such as food and mobility behaviors. Second, the analysis should consider different threshold levels of engagement. The strategies for increasing low-carbon behaviors are influenced by the level of involvement in low-carbon behaviors to which people are already committed. Behavioral changes can have a "ceiling effect" in specific domains (e.g., people using only bicycles for transport can hardly reduce their GHG emissions in this area), and distinct enabling and hindering factors can have varying salience depending on the level of individuals' engagement in low-carbon behaviors (Feldman and Sol Hart 2018; Mossler et al. 2017).

The proposed explanations of the origin of low-carbon behavior correspond to different types of policies and time orientations. Institutional approaches imply long-term processes such as tasking educational institutions with engaging in climate-change mitigation and climate justice by instilling pre-determined attitudes, knowledge, and behaviors (Bamberg et al. 2021; Bridges 2008). Socio-material innovation is a medium-term process that suggests fostering the development of niche innovations in socio-technical systems (Geels 2002, 2004, 2011). The interactionist approach relies on the influence of the social network in supporting shifts in behavior and would thus be favored by communication and direct interaction with individuals who have already adopted low-carbon lifestyles. Lastly, rational choice and goal framing theory point to policies of incentives and the strategic use of goal framing to support sudden short-term shifts to low-carbon behaviors (Fetchenhauer et al. 2006). All these policies and time-orientation perspectives represent promising strategies for enhancing low-carbon behavior, which can be employed by policymakers at different levels (local, national, and supranational), as well as by organizations and groups. Each strategy can benefit from a specific focus on the prosocial dimension rather than the pro-environmental side only.

Although our focus is limited to the way in which some contextual elements can influence individual (low-)carbon behavior, other social processes that may play a part are not considered for reasons of space. On the one hand, social institutions and culture may be subject to some dynamics of change that cannot be reduced to a shift in individual behaviors (i.e., technological or rule innovation) but that can influence the individual propensity for low-carbon behavior as well. On the other hand, the processes of policy implementation that can support low-carbon behavior involve a wide range of public and private organizations and states, which cannot be reduced to the sum of individual behaviors (Bamberg et al. 2021; Giesler and Veresiu 2014). Organizations and states are part of our framework but their internal dynamics that may lead to support for low-carbon behavior are not discussed. Research should also examine which dynamics may bring about policies, institutional changes, governance structures, and legal regimes that support climate justice and low-carbon behaviors (Morena et al. 2020; Pellizzoni et al. 2022; Steg et al. 2021). These actors can endorse the logic of prosocial behavior, but they can also be guided by different logics that may support low-carbon behavior. However, as in the case of individual behavior, organizational dynamics cannot be assumed to keep to the utilitarian

framework only; the prosocial logic should also be regarded as a chance for these actors to face global warming, which needs to be investigated. Overall, given the urgent need to change individual behaviors to reduce carbon emissions, the proposed research agenda focusing on the influence of context on individual (low-) carbon behavior can offer valuable insights to policymakers for reaching the target of the Paris Agreement.

Overall, climate solidarity is a new framework for the study of low-carbon behavior, which integrates interdisciplinary SSH knowledge about the origin of prosocial and pro-environmental behaviors. Within this framework, solidarity and prosocial behavior have a central role to play as potential drivers of low-carbon behaviors and can form the basis for further research across SSH disciplines. The analysis of the prosocial orientation of low-carbon behaviors and related mechanisms can make a significant contribution to climate-change mitigation.

REFERENCES

Abrahamse, Wokje and Linda Steg. 2013. "Social Influence Approaches to Encourage Resource Conservation: A Meta-Analysis." *Global Environmental Change* 23: 6: 1773–1785.

Adloff, Frank and Sighard Neckel. 2019. "Futures of Sustainability as Modernization, Transformation, and Control: A Conceptual Framework." *Sustainability Science* 14: 4: 1015–1025.

Agrawal, Arun and Maria Carmen Lemos. 2015. "Adaptive Development." *Nature Climate Change* 5: 3: 185–187.

Aklin, Michaël and Johannes Urpelainen. 2013. "Debating Clean Energy: Frames, Counter Frames, and Audiences." *Global Environmental Change* 23: 5: 1225–1232.

Alasuutari, Pertti and Ali Qadir. 2016. "Imageries of the Social World in Epistemic Governance." *International Sociology* 31: 6: 633–652.

Alexander, Jeffrey C. 2006. *The Civil Sphere*. New York: Oxford University Press.

Allen, Summer, Thomas Dietz, and Aaron M. McCright. 2015. "Measuring Household Energy Efficiency Behaviors with Attention to Behavioral Plasticity in the United States." *Energy Research & Social Science* 10: 133–140.

Althor, Glenn, James E.M. Watson, and Richard A. Fuller. 2016. "Global Mismatch Between Greenhouse Gas Emissions and the Burden of Climate Change." *Scientific Reports* 6: 1.

Aune, Margrethe, Åsne L. Godbolt, Knut H. Sørensen, Marianne Ryghaug, Henrik Karlstrøm, and Robert Næss. 2016. "Concerned Consumption. Global Warming Changing Household Domestication of Energy." *Energy Policy* 98: 290–297.

Axsen, Jonn and Kenneth S. Kurani. 2012. "Social Influence, Consumer Behavior, and Low-Carbon Energy Transitions." *Annual Review of Environment and Resources* 37: 311–340.

Bacharach, Michael and Diego Gambetta. 2001. "Trust as Type Detection," In Cristiano Castelfranchi and Yao-Hua Tan (eds.), *Trust and Deception in Virtual Societies*: pp. 1–26. Dordrecht: Springer.

Bain, Paul G., Matthew J. Hornsey, Renata Bongiorno, and Carla Jeffries. 2012. "Promoting Pro-Environmental Action in Climate Change Deniers." *Nature Climate Change* 2: 8: 600–603.

Bain, Paul G., Taciano Milfont, Yoshihisa Kashima, M. Michal Bilewicz, Guy Doron, Ragna B. Garðarsdóttir, Valdiney V. Gouveia, Yanjun Guan, Lars-Olof Johansson, Carlota Pasquali, Victor Corral-Verdugo, Juan Ignacio Aragones, Akira Utsugi, Christophe Demarque, Siegmar Otto, Joonha Park, Martin Soland, Linda Steg, Roberto González, Nadezhda Lebedeva, Ole Jacob Madsen, Claire Wagner, Charity S. Akotia, Tim Kurzand, and Niva Saviolidis. 2016. "Co-Benefits of Addressing Climate Change Can Motivate Action Around the World." *Nature Climate Change* 6: 2: 154–157.

Baldassarri, Delia and Guy Grossman. 2013. "The Effect of Group Attachment and Social Position on Prosocial Behavior. Evidence from Lab-in-the-Field Experiments." *PLoS One* 8: 3: e58750.

Bamberg, Sebastian, Daniel Fischer, and Sonja M. Geiger. 2021. "The Role of the Individual in the Great Transformation Toward Sustainability." *Frontiers in Psychology* 12: 710897.

Bardi, Anat and Robin Goodwin. 2011. "The Dual Route to Value Change: Individual Processes and Cultural Moderators." *Journal of Cross-Cultural Psychology* 42: 2: 271–287.

Barrett, Sam. 2013. "Local Level Climate Justice? Adaptation Finance and Vulnerability Reduction." *Global Environmental Change* 23: 6: 1819–1829.
Bayertz, Kurt. 1999. "Four Uses of 'Solidarity'," In Kurt Bayertz (ed.), *Solidarity*: pp. 3–28. Dordrecht: Kluwer.
Bazzani, Giacomo. 2019. "Teorie del denaro e carbon trading. Il frame dell'azione sociale per fronteggiare il riscaldamento globale." *Jura Gentium* XVI: 74–96.
Bazzani, Giacomo. 2020. *When Money Changes Society. The Case of Sardex Money as Community*. Wiesbaden: Springer VS.
Bazzani, Giacomo. 2021. "Digital Money for Sustainable Communities: The Sardex Case," In Andrea Maurer (ed.), *Handbook of Economic Sociology for the 21st Century: New Theoretical Approaches, Empirical Studies and Developments*: pp. 237–251. London: Springer.
Bazzani, Giacomo. 2022a. "Futures in Action: Expectations, Imaginaries and Narratives of the Future." *Sociology*: 1–16.
Bazzani, Giacomo. 2022b. "Agency as Conversion Process." *Theory and Society*: 1–21.
Bazzani, Giacomo. 2023. "The Agency of the Futures." *Cambio*: 1–15.
Beiser-McGrath, Liam F. and Thomas Bernauer. 2019. "Commitment Failures Are Unlikely to Undermine Public Support for the Paris Agreement." *Nature Climate Change* 9: 3: 248–252.
Bernauer, Thomas and Robert Gampfer. 2015. "How Robust Is Public Support for Unilateral Climate Policy?" *Environmental Science & Policy* 54: 316–330.
Bernauer, Thomas and Liam F. McGrath. 2016. "Simple Reframing Unlikely to Boost Public Support for Climate Policy." *Nature Climate Change* 6: 7: 680–683.
Bicchieri, Cristina. 2005. *The Grammar of Society: The Nature and Dynamics of Social Norms*. Cambridge: Cambridge University Press.
Bijker, Wiebe E. 1993. "Do Not Despair: There Is Life After Constructivism." *Science, Technology, & Human Values* 18: 1: 113–138.
Bolderdijk, Jan W., E. Linda Steg, Scott Geller, Philip K. Lehman, and Tom Postmes. 2013. "Comparing the Effectiveness of Monetary Versus Moral Motives in Environmental Campaigning." *Nature Climate Change* 3: 4: 413–416.
Bouman, Thijs and Linda Steg. 2019. "Motivating Society-Wide Pro-Environmental Change." *One Earth* 1: 1: 27–30.
Bouman, Thijs, Mark Verschoor, Casper J. Albers, Gisela Böhm, Stephen D. Fisher, Wouter Poortinga, Lorraine Whitmarsh, and Linda Steg. 2020. "When Worry About Climate Change Leads to Climate Action: How Values, Worry and Personal Responsibility Relate to Various Climate Actions." *Global Environmental Change* 62: 102061.
Bowles, Samuel and Herbert Gintis. 2011. *A Cooperative Species*. Princeton, NJ: Princeton University Press.
Brechin, Steven R. 2016. "Climate Change Mitigation and the Collective Action Problem: Exploring Country Differences in Greenhouse Gas Contributions." *Sociological Forum* 31: 846–861.
Bridges, David. 2008. "Educationalization: On the Appropriateness of Asking Educational Institutions to Solve Social and Economic Problems." *Educational Theory* 58: 4: 461–474.
Brunkhorst, Hauke. 2005. *Solidarity: From Civic Friendship to a Global Legal Community*. Cambridge, MA: Mit Press.
Brunkhorst, Hauke. 2007. "Globalizing Solidarity: The Destiny of Democratic Solidarity in the Times of Global Capitalism, Global Religion, and the Global Public." *Journal of Social Philosophy* 38: 1: 93–111.
Buchan, Nancy R., Gianluca Grimalda, Rick Wilson, Marilynn Brewer, Enrique Fatas, and Margaret Foddy. 2009. "Globalization and Human Cooperation." *Proceedings of the National Academy of Sciences of the United States of America* 106: 11: 4138–4142.
Buskens, Vincent and Werner Raub. 2013. "Rational Choice Research on Social Dilemmas: Embeddedness Effects on Trust," In Rafael Wittek, Tom A.B. Snijders, and Victor Nee (eds.), *The Handbook of Rational Choice Social Research*: pp. 113–150. Redwood, CA: Stanford University Press.
Calhoun, Craig J. 2002. "Imagining Solidarity: Cosmopolitanism, Constitutional Patriotism, and the Public Sphere." *Public Culture* 14: 1: 147–171.
Chong, Dennis and James N. Druckman. 2007. "Framing Public Opinion in Competitive Democracies." *American Political Science Review* 101: 4: 637–655.
Cialdini, Robert B. and Noah J. Goldstein. 2004. "Social Influence: Compliance and Conformity." *Annual Review of Psychology* 55: 591–621.
Clayton, Susan and Christie Manning (eds.). 2018. *Psychology and Climate Change: Human Perceptions, Impacts, and Responses*. Cambridge, MA: Academic Press.
Conte, Beatrice, Ulf J.J. Hahnel, and Tobias Brosch. 2021. "The Dynamics of Humanistic and Biospheric Altruism in Conflicting Choice Environments." *Personality and Individual Differences* 173: 110599.

Corner, Adam, Lorraine Whitmarsh, and Dimitrios Xenias. 2012. "Uncertainty, Scepticism and Attitudes Towards Climate Change: Biased Assimilation and Attitude Polarisation." *Climatic Change* 114: 3: 463–478.
Curran, Dean. 2017. "The Treadmill of Production and the Positional Economy of Consumption." *Canadian Review of Sociology/Revue Canadienne de Sociologie* 54: 1: 28–47.
De Beer, Paul and Ferry Koster. 2009. *Sticking Together or Falling Apart? Solidarity in an Era of Individualization and Globalization*. Amsterdam: Amsterdam University Press.
De Laet, Marianne and Annemarie Mol. 2000. "The Zimbabwe Bush Pump: Mechanics of a Fluid Technology." *Social Studies of Science* 30: 2: 225–263.
Dewey, John [1922] 1930. *Human Nature and Conduct: An Introduction to Social Psychology*. New York: The Modern Library.
Dietz, Thomas. 2014. "Understanding Environmentally Significant Consumption." *Proceedings of the National Academy of Sciences of the United States of America* 111: 14: 5067–5068.
Dietz, Thomas. 2016. "Environmental Value," In Tobias Brosch and David Sander (eds.), *Oxford Handbook of Value: Perspectives from Economics, Neuroscience, Philosophy, Psychology, and Sociology*: pp. 329–349. Oxford: Oxford University Press.
Douglas, Mary. 1986. *How Institutions Think*. Syracuse, NY: Syracuse University Press.
Drews, Stefan and Jeroen Van den Bergh. 2016. "What Explains Public Support for Climate Policies? A Review of Empirical and Experimental Studies." *Climate Policy* 16: 7: 855–876.
Druckman, James N. and Mary C. McGrath. 2019. "The Evidence for Motivated Reasoning in Climate Change Preference Formation." *Nature Climate Change* 9: 2: 111–119.
Dubois, Ghislain, Benjamin Sovacool, Carlo Aall, Maria Nilsson, Carine Barbier, Alina Herrmann, Sébastien Bruyère, Camilla Andersson, Bore Sköld, Franck Nadaud, Florian Dorner, Karen R. Moberg, Jean P. Ceron, Helen Fischer, Dorothee Amelung, Marta Baltruszewicz, Jeremy Fischer, Françoise Bénévise, Valerie Louis, and Rainer Sauerborn. 2019. "It Starts at Home? Climate Policies Targeting Household Consumption and Behavioral Decisions Are Key to Low-Carbon Futures." *Energy Research & Social Science* 52: 144–158.
Durkheim, Emile [1893] 1964. *The Division of Labor in Society*. New York: Free Press.
Ellemers, Naomi, Russell Spears, and Bertjan Doosje. 2002. "Self and Social Identity." *Annual Review of Psychology* 53: 1: 161–186.
Ellickson, Robert C. 1991. *Order Without Law*. Cambridge, MA: Harvard University Press.
Ellwardt, Lea, Christian Steglich, and Rafael Wittek. 2012. "The Co-Evolution of Gossip and Friendship in Workplace Social Networks." *Social Networks* 34: 4: 623–633.
Evans, Laurel, Gregory R. Maio, Adam Corner, Carl J. Hodgetts, S. Sameera Ahmed, and Ulrike Hahn. 2013. "Self-Interest and Pro-Environmental Behaviour." *Nature Climate Change* 3: 2: 122–125.
Falkner, Robert. 2016. "The Paris Agreement and the New Logic of International Climate Politics." *International Affairs* 92: 5: 1107–1125.
Feinberg, Matthew and Robb Willer. 2013. "The Moral Roots of Environmental Attitudes." *Psychological Science* 24: 1: 56–62.
Feldman, Lauren and P. Sol Hart. 2018. "Climate Change as a Polarizing Cue: Framing Effects on Public Support for Low-Carbon Energy Policies." *Global Environmental Change* 51: 54–66.
Fesenfeld, Lukas P. 2020. *The Political Feasibility of Transformative Climate Policy–Public Opinion About Transforming Food and Transport Systems*. Zurich: ETH Research Collection.
Fesenfeld, Lukas P., Yixian Sun, Michael Wicki, and Thomas Bernauer. 2021. "The Role and Limits of Strategic Framing for Promoting Sustainable Consumption and Policy." *Global Environmental Change* 68: 102266.
Fetchenhauer, Detlef, Andreas Flache, Abraham Buunk, and Siegwart Lindenberg (eds.). 2006. *Solidarity and Prosocial Behavior: An Integration of Sociological and Psychological Perspectives*. London: Springer.
Fielding, Kelly S. and Matthew J. Hornsey. 2016. "A Social Identity Analysis of Climate Change and Environmental Attitudes and Behaviors: Insights and Opportunities." *Frontiers in Psychology* 7: 121.
Fielding, Kelly S. and Winnifred R. Louis. 2020. "The Role of Social Norms in Communicating About Climate Change," In David C. Holmes and Lucy M. Richardson (eds.), *Research Handbook on Communicating Climate Change*: pp. 106–115. Cheltenham and Northampton: Edward Elgar Publishing.
Foote, Nelson N. 1951. "Identification as the Basis for a Theory of Motivation." *American Sociological Review* 16: 1: 14–21.
Foster, John B. 2000. *Marx's Ecology: Materialism and Nature*. New York: Monthly press.
Fox, Nick J. and Pam Alldred. 2020. "Re-Assembling Climate Change Policy: Materialism, Posthumanism, and the Policy Assemblage." *The British Journal of Sociology* 71: 2: 269–283.
Geels, Frank W. 2002. "Technological Transitions as Evolutionary Reconfiguration Processes: A Multi-Level Perspective and a Case-Study." *Research Policy* 31: 8–9: 1257–1274.

Geels, Frank W. 2004. "From Sectoral Systems of Innovation to Socio-Technical Systems: Insights About Dynamics and Change from Sociology and Institutional Theory." *Research Policy* 33: 6–7: 897–920.
Geels, Frank W. 2011. "The Multi-Level Perspective on Sustainability Transitions: Responses to Seven Criticisms." *Environmental Innovation and Societal Transitions* 1: 1: 24–40.
Geels, Frank W. 2020. "Micro-Foundations of the Multi-Level Perspective on Socio-Technical Transitions: Developing a Multi-Dimensional Model of Agency Through Crossovers Between Social Constructivism, Evolutionary Economics and Neo-Institutional Theory." *Technological Forecasting and Social Change* 152: 119894.
Geels, Frank W., Tim Schwanen, Steve Sorrell, Kirsten Jenkins, and Benjamin K. Sovacool. 2018. "Reducing Energy Demand Through Low Carbon Innovation: A Sociotechnical Transitions Perspective and Thirteen Research Debates." *Energy Research & Social Science* 40: 23–35.
Giesler, Markus and Ela Veresiu. 2014. "Creating the Responsible Consumer: Moralistic Governance Regimes and Consumer Subjectivity." *Journal of Consumer Research* 41: 3: 840–857.
Gössling, Stefan, Andreas Humpe, and Thomas Bausch. 2020. "Does 'Flight Shame' Affect Social Norms? Changing Perspectives on the Desirability of Air Travel in Germany." *Journal of Cleaner Production* 266: 122015.
Gottfredson, Michael R. and Travis Hirschi. 1990. *A General Theory of Crime*. Stanford, CA: Stanford University Press.
Grimalda, Gianluca, Nancy Buchan, and Marilynn Brewer. 2018. "Social Identity Mediates the Positive Effect of Globalization on Individual Cooperation: Results from International Experiments." *PLoS One* 13: 12: e0206819.
Grimalda, Gianluca, Nancy R. Buchan, Orgul D. Ozturk, Adriana C. Pinate, Giulia Urso, and Marilynn B. Brewer. 2021. "Exposure to COVID-19 Is Associated with Increased Altruism, Particularly at the Local Level." *Scientific Reports* 11: 1: 1–14.
Guthman, Julie. 2007. "The Polanyian Way? Voluntary Food Labels as Neoliberal Governance." *Antipode* 39: 3: 456–478.
Hahnel, Ulf J., Oliver Arnold, Michael Waschto, Liridon Korcaj, Karen Hillmann, Damaris Roser, and Hans Spada. 2015. "The Power of Putting a Label on it: Green Labels Weigh Heavier than Contradicting Product Information for Consumers' Purchase Decisions and Post-Purchase Behavior." *Frontiers in Psychology* 6: 1392.
Hardin, Garrett. 1968. "The Tragedy of the Commons: The Population Problem Has No Technical Solution; it Requires a Fundamental Extension in Morality." *Science* 162: 3859: 1243–1248.
Hardisty, David J., Eric J. Johnson, and Elke U. Weber. 2010. "A Dirty Word or a Dirty World? Attribute Framing, Political Affiliation, and Query Theory." *Psychological Science* 21: 1: 86–92.
Heiskanen, Eva, Mikael Johnson, Simon Robinson, Edina Vadovics, and Mika Saastamoinen. 2010. "Low-Carbon Communities as a Context for Individual Behavioural Change." *Energy Policy* 38: 12: 7586–7595.
Heiskanen, Eva, Mikko Jalas, Jenny Rinkinen, and Pasi Tainio. 2015. "The Local Community as a "Low-Carbon Lab". Promises and Perils." *Environmental Innovation and Societal Transitions* 14: 149–164.
Hertwich, Edgar G. and Glen P. Peters. 2009. "Carbon Footprint of Nations: A Global, Trade-Linked Analysis." *Environmental Science & Technology* 43: 16: 6414–6420.
Hitlin, Steven. 2014. "Social Psychological Ingredients for a Sociology of Morality," In Vincent Jeffries (ed.), *The Palgrave Handbook of Altruism, Morality, and Social Solidarity*: pp. 195–217. New York: Palgrave Macmillan.
Hoffmann, M.L. 1983. "Affective and Cognitive Processes in Moral Internalization," In E. Tory Higgins, Diane Ruble, and Willard W. Hartup (eds.), *Social Cognition and Social Development: A Sociocultural Perspective*: pp. 236–274. Cambridge: Cambridge University Press.
Höhne, Niklas, Michel den Elzen, Joeri Rogelj, Bert Metz, Taryn Fransen, Takeshi Kuramochi, Anne Olhoff, Joseph Alcamo, Harald Winkler, Fu Sha, Michiel Schaeffer, Roberto Schaeffer, Glen P. Peters, Simon Maxwell, and Navroz K. Dubash. 2020. "Emissions: World Has Four Times the Work or One-Third of the Time." *Nature* 579: 25–28.
Hunt, Scott A. and Robert D. Benford. 2004. "Collective Identity, Solidarity, and Commitment." *The Blackwell Companion to Social Movements* 433: 57.
IPCC. 2014. *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.
IPCC. 2018. *Global Warming of 1.5°C: An IPCC Special Report on the Impacts of Global Warming of 1.5°C Above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty*. Geneva, Switzerland: IPCC. Accessed September 30, 2022. http://www.ipcc.ch/report/sr15/

Islam, Saidul and Ismail Hossain. 2015. "The Global Treadmill of Production and the Environment," In Saidul Islam and Ismail Hossain (eds.), *Social Justice in the Globalization of Production*: pp. 144–158. London: Palgrave Macmillan.
Jans, Lise, Thijs Bouman, and Kelly Fielding. 2018. "A Part of the Energy 'In Crowd': Changing People's Energy Behavior Via Group-Based Approaches." *IEEE Power and Energy Magazine* 16: 1: 35–41.
Jorgenson, Andrew K. 2018. "Broadening and Deepening the Presence of Environmental Sociology." *Sociological Forum* 33: 4: 1086–1091.
Joyeeta, Gupta. 2007. "Globalization, Environmental Challenges and North-South Issues," In Khi V. Thai, Dianne Rahm, and Jerrell D. Coggburn (eds.), *Handbook of Globalization and the Environment*: pp. 449–472. New York: Taylor and Francis.
Kastner, Ingo and Paul C. Stern. 2015. "Examining the Decision-Making Processes Behind Household Energy Investments: A Review." *Energy Research & Social Science* 10: 72–89.
Köhler, Jonathan, Frank W. Geels, Florian Kern, Jochen Markard, Elsia Onsongo, Anna Wieczorek, Floortje Alkemade, Flor Avelino, Anna Bergek, Frank Boons, Lea Fünfschilling, David J. Hess, Georg Holtz, Sampsa Hyysalo, Kirsten Jenkins, Paula Kivimaa, Mari Martiskainen, Andrew McMeekin, Marie Susan Mühlemeier, Björn Nykvist, Elsie Onsongo, Bonno Pel, Rob Raven, Harald Rohracher, Björn A. Sandén, Johan Schot, Benjamin K. Sovacool, Bruno Turnheim, Daniel Welch, and Peter Wells. 2019. "An Agenda for Sustainability Transitions Research: State of the Art and Future Directions." *Environmental Innovation and Societal Transitions* 31: 1–32.
Korcaj, Liridon, Ulf J. Hahnel, and Hans Spada. 2015. "Intentions to Adopt Photovoltaic Systems Depend on Homeowners' Expected Personal Gains and Behavior of Peers." *Renewable Energy* 75: 407–415.
Kuch, Declan. 2015. *The Rise and Fall of Carbon Emissions Trading*. New York: Palgrave Macmillan.
Laitinen, Arto and Anne Birgitta Pessi (eds.). 2014. *Solidarity: Theory and Practice*. London: Lexington Books.
Lakoff, George. 2010. "Why it Matters How We Frame the Environment." *Environmental Communication* 4: 1: 70–81.
Latour, Bruno. 1987. *Science in Action: How to Follow Scientists and Engineers through Society*. Cambridge, MA: Harvard University Press.
Latour, Bruno. 1992. "Where Are the Missing Masses? The Sociology of a Few Mundane Artifacts," In Wiebe E. Bijker and John Law (eds.), *Shaping Technology/Building Society: Studies in Sociotechnical Change*: pp. 225–258. Cambridge, MA: MIT Press.
Levesque, Antoine, Robert C. Pietzcker, and Gunnar Luderer. 2019. "Halving Energy Demand from Buildings: The Impact of Low Consumption Practices." *Technological Forecasting and Social Change* 146: 253–266.
Lindenberg, Siegwart. 1997. "Grounding Groups in Theory." *Advances in Group Processes* 14: 281–331.
Lindenberg, Siegwart. 1998. "Solidarity: Its Microfoundations and Macro-Dependence. A Framing Approach," In Patrick Doreian, Thomas J. Fararo, and Thomas J. Fararo (eds.), *The Problem of Solidarity: Theories and Models*: pp. 61–112. London: Routledge.
Lindenberg, Siegwart. 2003. "Governance Seen from a Framing Point of View: The Employment Relationship and Relational Signaling," In Bart Nooteboom and Fredrique Six (eds.), *The Trust Process in Organizations, Empirical Studies of the Determinants and the Process of Trust Development*: pp. 37–57. Cheltenham and Northampton: Edward Elgar Publishing.
Lindenberg, Siegwart, Detlaf Fetchenhauer, Andreas Flache, and Abraham P. Buunk. 2006. "Solidarity and Prosocial Behavior: A Framing Approach," In Detlaf Fetchenhauer, Andreas Flache, Abraham P. Buunk, and Siegwart Lindenberg (eds.), *Solidarity and Prosocial Behavior: An Integration of Sociological and Psychological Perspectives*: pp. 3–19. New York: Springer.
Lindenberg, Siegwart and Linda Steg. 2007. "Normative, Gain and Hedonic Goal Frames Guiding Environmental Behavior." *Journal of Social Issues* 63: 1: 117–137.
Lorenzoni, Irene and Nick F. Pidgeon. 2006. "Public Views on Climate Change: European and USA Perspectives." *Climatic Change* 77: 1: 73–95.
Luque-Ayala, Andrés and Simon Marvin. 2019. "Developing a Critical Understanding of Smart Urbanism," In Tim Schwanen and Ronald Van Kempen (eds.), *Handbook of Urban Geography*: pp. 210–224. Cheltenham and Camberley: Edward Elgar Publishing.
MacKendrick, Norah. 2018. *Better Safe than Sorry: How Consumers Navigate Exposure to Everyday Toxics*. Oakland: University of California Press.
Maki, Alexander, Rachel J. Burns, Long Ha, and Alexander J. Rothman. 2016. "Paying People to Protect the Environment: A Meta-Analysis of Financial Incentive Interventions to Promote Proenvironmental Behaviors." *Journal of Environmental Psychology* 47: 242–255.
Malhotra, Deepak and J. Keith Murnighan. 2002. "The Effects of Contracts on Interpersonal Trust." *Administrative Science Quarterly* 47: 3: 534–559.

Marres, Noortje. 2015. *Material Participation*. London: Palgrave Macmillan.
Marshall, George. 2015. *Don't Even Think About it: Why Our Brains Are Wired to Ignore Climate Change*. New York: Bloomsbury Publishing.
Mauss, Marcel [1923] 1954. *The Gift*. Glencoe, IL: Free Press.
May, Larry. 1996. *The Socially Responsive Self: Social Theory and Professional Ethics*. Chicago: The University of Chicago Press.
McDonald, Rachel I., Kelly S. Fielding, and Winnifred R. Louis. 2014. "Conflicting Norms Highlight the Need for Action." *Environment and Behavior* 46: 2: 139–162.
Meyer, John W. 2010. "World Society, Institutional Theories, and the Actor." *Annual Review of Sociology* 36: 1: 1–20.
Meyer, John W., John Boli, George M. Thomas, and Francisco O. Ramirez. 1997. "World Society and the Nation-State." *American Journal of Sociology* 103: 1: 144–181.
Millar, Richard J., Jan S. Fuglestvedt, Pierre Friedlingstein, Joeri Rogelj, Michael J. Grubb, Damon H. Matthews, Ragnhild B. Skeie, Piers M. Forster, David J. Frame, and Myles R. Allen. 2017. "Emission Budgets and Pathways Consistent with Limiting Warming to 1.5°C." *Nature Geoscience* 10: 10: 741–747.
Moberg, Karen R., Carlo Aall, Florian Dorner, Elsa Reimerson, Jean-Paul Ceron, Bore Sköld, Benjamin K. Sovacool, and Valentino Piana. 2019. "Mobility, Food and Housing: Responsibility, Individual Consumption and Demand-Side Policies in European Deep Decarbonisation Pathways." *Energy Efficiency* 12: 2: 497–519.
Molm, Linda D., Nobuyuki Takahashi, and Gretchen Peterson. 2000. "Risk and Trust in Social Exchange: An Experimental Test of a Classical Proposition." *American Journal of Sociology* 105: 5: 1396–1427.
Moran, Daniel, Richard Wood, Edgar Hertwich, Kim Mattson, Joao F.D. Rodriguez, Karin Schanes, and John Barrett. 2020. "Quantifying the Potential for Consumer-Oriented Policy to Reduce European and Foreign Carbon Emissions." *Climate Policy* 20: Suppl 1: S28–S38.
Morena, Edouard, Dunja Krause, and Dimitris Stevis (eds.). 2020. *Just Transitions: Social Justice in the Shift Towards a Low-Carbon World*. London: Pluto Press.
Mossler, Max V., Ann Bostrom, Ryan P. Kelly, Katherina M. Crosman, and Patricia Moy. 2017. "How Does Framing Affect Policy Support for Emissions Mitigation? Testing the Effects of Ocean Acidification and Other Carbon Emissions Frames." *Global Environmental Change* 45: 63–78.
Nielsen, Kristian, Paul Stern, Thomas Dietz, Jonathan M. Gilligan, Maria J. Figueroa, Carl Folke, Wencke Gwozdz, Diana Ivanova, Lucia A. Reisch, Michael P. Vandenbergh, Kimberly S. Wolske, and Richard Wood. 2020. "Improving Climate Change Mitigation Analysis: A Framework for Examining Feasibility." *One Earth* 3: 3: 325–336.
Noppers, Ernest H., Kess Keizer, Jan W. Bolderdijk, and Linda Steg. 2014. "The Adoption of Sustainable Innovations: Driven by Symbolic and Environmental Motives." *Global Environmental Change* 25: 52–62.
Norgaard, Kari Marie. 2011. *Living in Denial: Climate Change, Emotions, and Everyday Life*. Cambridge, MA: MIT Press.
Ostrom, Elinor, Joanna Burger, Chistopher B. Field, Richard B. Norgaard, and David Policansky. 1999. "Revisiting the Commons: Local Lessons, Global Challenges." *Science* 284: 5412: 278–282.
Patriotta, Gerardo. 2020. "Actors and Actorhood in Institutional Theory." *Journal of Management Studies* 57: 4: 867–872.
Pellizzoni, Luigi, Emanuele Leonardi, and Viviana Asara (eds.). 2022. *Handbook of Critical Environmental Politics*. Cheltenham and Northampton: Edward Elgar Publishing.
Perlaviciute, Goda and Linda Steg. 2014. "Contextual and Psychological Factors Shaping Evaluations and Acceptability of Energy Alternatives: Integrated Review and Research Agenda." *Renewable and Sustainable Energy Reviews* 35: 361–381.
Perlaviciute, Goda, Linda Steg, and Benjamin K. Sovacool. 2021. "A Perspective on the Human Dimensions of a Transition to Net-Zero Energy Systems." *Energy and Climate Change* 2: 100042.
Piliavin, Jane Allyn and Hong-Wen Charng. 1990. "Altruism: A Review of Recent Theory and Research." *Annual Review of Sociology* 16: 1: 27–65.
Robertson, Roland. 1992. *Globalization: Social Theory and Global Culture*. London: Sage.
Rogelj, Jorei, Gunnar Luderer, Robert C. Pietzcker, Elmar Kriegler, Michiel Schaeffer, Volker Krey, and Keywan Riahi. 2015. "Energy System Transformations for Limiting End-of-Century Warming to below 1.5°C." *Nature Climate Change* 5: 6: 519–527.
Rorty, Richard. 1989. *Contingency, Irony, and Solidarity*. Cambridge: Cambridge University Press.
Rudel, Thomas K. 2013. *Defensive Environmentalists and the Dynamics of Global Reform*. New York: Cambridge University Press.

Ruhrort, Lisa and Viktoria Allert. 2021. "Conceptualizing the Role of Individual Agency in Mobility Transitions: Avenues for the Integration of Sociological and Psychological Perspectives." *Frontiers in Psychology* 12: 1368.

Rabkin, Sarah and David Gershon. 2007. "Changing the World One Household at a Time: Portland's 30-Day Program to Lose 5,000 Pounds," In Susanne C. Moser and Lisa Dilling (eds.), *Creating a Climate for Change: Communicating Climate Change and Facilitating Social Change*: pp. 292–302. Cambridge: Cambridge University Press.

Sanderson, Benjamin M., Brian C. O'Neill, and Claudia Tebaldi. 2016. "What Would it Take to Achieve the Paris Temperature Targets?" *Geophysical Research Letters* 43: 13: 7133–7142.

Sareen, Siddharth. 2021. "Scalar Biases in Solar Photovoltaic Uptake. Socio-Materiality, Regulatory Inertia and Politics," In Ankit Kumar, Johanna Höffken, and Auke Pols (eds.), *Dilemmas of Energy Transitions in the Global South: Balancing Urgency and Justice*: pp. 78–92. London: Routledge.

Schnaiberg, Allan. 1980. *The Environment: From Surplus to Scarcity*. New York: Oxford University Press.

Scholz, Sally J. 2008. *Political Solidarity*. University Park: Pennsylvania State University Press.

Schultz, P. Wesley, Jessica M. Nolan, Robert B. Cialdini, Noah J. Goldstein, and Vladas Griskevicius. 2007. "The Constructive, Destructive, and Reconstructive Power of Social Norms." *Psychological Science* 18: 5: 429–434.

Schwartz, Daniel, Bruine de Bruin, Baruch Fischhoff Wändi, and Leaster Lave. 2015. "Advertising Energy Saving Programs: The Potential Environmental Cost of Emphasizing Monetary Savings." *Journal of Experimental Psychology: Applied* 21: 158–166.

Seligman, Martin E., Peter Railton, Roy F. Baumeister, and Chandra Sripada. 2013. "Navigating into the Future or Driven by the Past." *Perspectives on Psychological Science* 8: 2: 119–141.

Sloot, Daniel, Lise Jans, and Linda Steg. 2018. "Can Community Energy Initiatives Motivate Sustainable Energy Behaviours? The Role of Initiative Involvement and Personal pro-Environmental Motivation." *Journal of Environmental Psychology* 57: 99–106.

Smith, Christian and Katherine Sorrell. 2014. "On Social Solidarity," In Vincent Jeffries (ed.), *The Palgrave Handbook of Altruism, Morality, and Social Solidarity*: pp. 219–247. New York: Palgrave Macmillan.

Sommerfeld, Ralph D., Hans-Jürgen Krambeck, Dirk Semmann, and Manfred Milinski. 2007. "Gossip as an Alternative for Direct Observation in Games of Indirect Reciprocity." *Proceedings of the National Academy of Sciences of the United States of America* 104: 44: 17435–17440.

Sovacool, Benjamin K., Luisa F. Cabeza, Anna L. Pisello, Andrea F. Colladon, Hatef M. Larijani, Belal Dawoud, and Mari Martiskainen. 2021. "Decarbonizing Household Heating: Reviewing Demographics, Geography and Low-Carbon Practices and Preferences in Five European Countries." *Renewable and Sustainable Energy Reviews* 139: 110703.

Spillman, Lyn. 2012. *Solidarity in Strategy: Making Business Meaningful in American Trade Asociation*. Chicago: University of Chicago Press.

Steg, Linda. 2016. "Values, Norms, and Intrinsic Motivation to Act Proenvironmentally." *Annual Review of Environment and Resources* 41: 277–292.

Steg, Linda, Jan W. Bolderdijk, Kees Keizer, and Goda Perlaviciute. 2014. "An Integrated Framework for Encouraging Pro-Environmental Behaviour: The Role of Values, Situational Factors and Goals." *Journal of Environmental Psychology* 38: 104–115.

Steg, Linda and Judith de Groot. 2012. "Environmental Values," In Susan Clayton (ed.), *The Oxford Handbook of Environmental and Conservation Psychology*: pp. 81–92. Oxford: Oxford University Press.

Steg, Linda, Goda Perlaviciute, Benjamin K. Sovacool, Marino Bonaiuto, Andreas Diekmann, Massimo Filippini, Frank Hindriks, Cecilia Jacobbson Bergstad, Ellen Matthies, Simon Matti, Machiel Mulder, Andreas Nilsson, Sabina Pahl, Martha Roggenkamp, Geertje Schuitema, Paul C. Stern, Massimo Tavoni, John Thøgersen, and Edwin Woerdman. 2021. "A Research Agenda to Better Understand the Human Dimensions of Energy Transitions." *Frontiers in Psychology* 12: 672776.

Steg, Linda and Charles Vlek. 2009. "Encouraging Pro-Environmental Behaviour: An Integrative Review and Research Agenda." *Journal of Environmental Psychology* 29: 3: 309–317.

Stern, Paul C. and Thomas Dietz. 2020. "A Broader Social Science Research Agenda on Sustainability: Nongovernmental Influences on Climate Footprints." *Energy Research & Social Science* 60: 101401.

Stjerno, Steinar. 2004. *Solidarity in Europe: The History of an Idea*. Cambridge: Cambridge University Press.

Szasz, Andrew. 2007. *Shopping Our Way to Safety: How We Changed from Protecting the Environment to Protecting Ourselves*. Minneapolis: University of Minnesota Press.

Tajfel, Henry and John C. Turner. 2004. "The Social Identity Theory of Intergroup Behaviour," In John T. Jost and Jim Sidanius (eds.), *Psychology of Intergroup Relations*: pp. 276–293. London: Psychology press.

Tuomi, Aarni and Iis P. Tussyadiah. 2020. "Building the Sociomateriality of Food Service." *International Journal of Hospitality Management* 89: 102553.
Turner, John C., Michael A. Hogg, Penelope J. Oakes, Stephen D. Reicher, and Margaret S. Wetherell. 1987. *Rediscovering the Social Group: A Self-Categorization Theory*. London: Blackwell.
United Nations Environment Programme (UNEP). 2019. *Emissions Gap Report 2019*. Nairobi: UNEP.
United Nations Framework Convention on Climate Change (UNFCCC). 2015. "Paris Agreement." United Nations. Accessed September 30, 2022. https://unfccc.int/sites/default/files/english_paris_agreement.pdf
van de Ven, Dirk-Jan, Mikel González-Eguino, and Iñaki Arto. 2018. "The Potential of Behavioural Change for Climate Change Mitigation: A Case Study for the European Union." *Mitigation and Adaptation Strategies for Global Change* 23: 6: 853–886.
Venhoeven, Leonie A., Jan Willem Bolderdijk, and Linda Steg. 2020. "Why Going Green Feels Good." *Journal of Environmental Psychology* 71: 101492.
WCED. 1987. *Our Common Future*. New York: World Commission on Environment and Development. Accessed September 30, 2022. http://www.un-documents.net/our-common-future.pdf
Whitmarsh, Lorraine, Dimitrios Xenias, and Christopher R. Jones. 2019. "Framing Effects on Public Support for Carbon Capture and Storage." *Palgrave Communications* 5: 1: 1–10.
Wilde, Lawrence. 2013. *Global Solidarity*. Edinburgh: Edinburgh University Press.
Wilk, Richard. 2002. "Consumption, Human Needs, and Global Environmental Change." *Global Environmental Change* 12: 1: 5–13.
Wittek, Rafael. 2003. "Norm Violations and Informal Control in Organizations: A Relational Signaling Perspective," In Bart Nooteboom and Fredrique Six (eds.), *The Trust Process in Organizations: Empirical Studies of the Determinants and the Process of Trust Development*: pp. 168–195. Cheltenham: Edward Elgar Publishing.
Wittek, Rafael and René Bekkers. 2015. "Altruism and Prosocial Behavior, Sociology of," In James D. Wright (ed.), *International Encyclopedia of the Social & Behavioral Sciences*: pp. 579–583. Amsterdam: Elsevier.
Wynes, Seth and Kimberly A. Nicholas. 2017. "The Climate Mitigation Gap: Education and Government Recommendations Miss the Most Effective Individual Actions." *Environmental Research Letters* 12: 7: 074024.
Yamagishi, Toshio and Toko Kiyonari. 2000. "The Group as the Container of Generalized Reciprocity." *Social Psychology Quarterly* 63: 2: 116–132.
Zarazua de Rubens, Gerardo, Lance Noel, and Benjamin K. Sovacool. 2018. "Dismissive and Deceptive Car Dealerships Create Barriers to Electric Vehicle Adoption at the Point of Sale." *Nature Energy* 3: 6: 501–507.
Zerubavel, Eviatar. 2002. "The Elephant in the Room: Notes on the Social Organization of Denial," In Karen A. Cerulo (ed.), *Culture in Mind: Toward a Sociology of Culture and Cognition*: pp. 21–27. New York: Routledge.
Zerubavel, Eviatar. 2006. *The Elephant in the Room: Silence and Denial in Everyday Life*. New York: Oxford University Press.