

Cooperation, Trust, and Antagonism: How Public Goods Are Promoted

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Summary

One of the most continually vexing problems in society is the variability with which citizens support endeavors that are designed to help a great number of people. In this article, we examine the twin roles of cooperative and antagonistic behavior in this variability. We find that each plays an important role, though their contributions are, understandably, at odds. It is this opposition that produces seeming unpredictability in citizen response to collective need. In fact, we suggest that careful consideration of the research allows one to often predict when efforts to provide a collectively beneficial good will succeed and when they will fail.

To understand the dynamics of participation in response to collective need, it is necessary to distinguish between the primary types of need situations. A *public good* is an entity that relies in whole or in part on contributions to be provided. Examples of public goods are charities and public broadcasting. Public goods require that citizens experience a short-term loss (of their contribution) in order to realize a long-term gain (of the good). However, because everyone can use the good once it is provided, there is also an incentive to not contribute, let others give, and then take advantage of their efforts. This state of affairs introduces a conflict between doing what is best for oneself and what is best for the group. In a public goods situation, cooperation and antagonism impact how one resolves this conflict.

The other major type of need situation is a *common-pool resource problem*. Here, a good is fully provided at the outset, and citizens may sample from it. The resource is usually, but not necessarily, partially replenished. Examples of replenished resources are drinking water and trees; examples of resources that are functionally not replenished are oil and minerals. Common-pool resources allow citizens to experience a short-term gain (by getting what they want in the early life of the resource) but also present the possibility of a long-term loss (if the resource dries up). As with public goods, there is thus a conflict between, on the one hand, acting in one's best interest and taking as much as one wants all the time and, on the other, acting for the good of the group, which requires taking a lesser amount so that the replenishment rate can keep up with the rate of use. As with public goods, both cooperation and antagonism affect this decision.

With these situations in mind, we can now dig deeply into the dynamics of both cooperation and antagonism. Cooperation is one of the most heavily studied aspects of human behavior, yet despite this attention, there is much that is not understood about it, including its fundamental base. There are a number of different perspectives on the base. *Interdependence theory* argues that cooperation is driven by how one interprets the subjective value of the outcomes that will result from various combinations of behaviors. A person who sees a potential result of “50 to you, 50 to me” as “We both would do well” is more likely to cooperate than the person who sees it as “I would not outgain the other person.” *Self-control theory* suggests that cooperation is a function of how well a person can resist the impulse to benefit now and delay gratification. *Evolutionary theory* takes many forms but revolves around the extent to which cooperation is adaptive. Finally, the *appropriateness framework* takes a cognitive approach and assumes that cooperation is determined by a combination of social–cognitive (interpretation of self and the situation)

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and decision-heuristic factors. We propose that it is possible to integrate across these approaches and understand cooperation as a behavior that is influenced by all of these factors as well as other dynamics, such as cultural mores and personality traits.

Antagonism, as it relates to the collective welfare, is a phenomenon with a lesser history but one that is clearly influential. A number of facets of antagonism are relevant. *Power*, and its abuse, is a major factor, and a specific application to collective goods is the notion of a “gatekeeper,” or a person who can completely determine whether a public good exists or a common-pool resource can be used. Gatekeepers tend to demand ample compensation from others in order for the good or resource to go forward. If this demand is resisted, as it often is, the end result is that the good is not provided or the resource not accessed. Another facet is the *desire to see an out-group be harmed*. Sometimes, this motivation is so strong that people will deny themselves a good outcome in order to see the harm occur. Why someone would want to see an out-group be harmed is debatable, but it may be attributable to a desire to be seen as a winner, or it may be a strategy designed to produce a net benefit for one’s in-group. *Emotions* also play a role, with people tending to assume that out-group members have just basic emotions such as happiness and sadness and not secondary emotions such as guilt and shame. Because out-group members are emotionally simple, it is seen as acceptable to treat them badly. Complicating matters even further is that antagonism can sometimes be seen against in-group members who deviate, in either direction, from the group norm and against individuals who are behaving in a clearly selfless manner, like volunteers.

A number of approaches have been proposed to the resolution of public goods problems. *Structural solutions* act to alter the basic dynamic of the dilemma by means of interventions such as rewards for cooperation, punishment for noncooperation, and selection of a single group member to chart a course of action for everyone. *Third-party solutions* involve the bringing in of an external agent to help determine how group members should behave. These agents may be more passive and merely suggest solutions, or they may be more active and dictate how decisions will be made, what decision will be made, or both. Finally, *psychological solutions* involve changing how people view the situation.

We finish by discussing how policy makers can improve the chances of a publicly valuable good being supported. We particularly emphasize creation of a felt connection with future generations; clear demonstration of immediate and concrete consequences as a result of failure to provide the good; instillation of a sense of community; and isolation of the good from other, related issues. We also take up the general problem of distrust of those who establish policy and discuss some methods for helping minimize distrust.

Keywords

cooperation, public goods, hostility, distrust, interdependence

Introduction

A feature of all societies, regardless of how primitive or advanced, is that they contain some entities that may be consumed by all members. These public goods and common-pool resources share two features: Members of the group must contribute something toward the provision and/or maintenance of the entity; and all group members may use the entity, regardless of whether one assisted with its creation or maintenance. While they are sometimes critical (a water table) and sometimes merely pleasant (a public park), they are undeniably beneficial and wanted. Indeed, particular goods are so central to societal functioning that the society is in danger of collapse if the good disappears. Imagine for the moment the disruption to the world economy if petroleum pools just suddenly dried up. Such publicly beneficial goods have long been a focus of study in psychology as well as economics, political science, sociology, and biology.

The many studies that exist across these literatures suggest that humans sometimes do a good job and sometimes do a poor job, of both providing and sustaining public goods and resources. On the “poor job” side, examples are quite prominent: Even after controlling for economic conditions, giving to charities (a public good) is at historic lows. Consumption of fossil fuels (a resource) has slowed only minimally, despite higher prices and warnings that all of the major reserves have been discovered. Voter turnout (government is a public good) in countries in which voting is voluntary (i.e., not required by law) is dismal. However, examples of people managing goods and resources well, though less visible, are nonetheless readily available. Giving to charities, even if low, nonetheless occurs, when standard economic analyses indicate that it should never happen, because it is not “rational.” In fact, those who give do so at admirable levels. In the United States, for example, the mean amount given by donors per year exceeds \$1,500 (Wiepking,

2010). Experiments consistently show frequent cooperation between strangers performing onetime tasks, when there is no personal benefit to be gained from offering such cooperation. Evidence from contemporary communal-grazing communities shows that people in such communities actually do a good job of managing the lands (Gebremedhin, Pender, & Tesfay, 2004). There is thus clearly much evidence that people have the potential to mismanage collective goods, but there is also much evidence that they can manage well such goods.

From one perspective, this pattern of behavior is not surprising. Classical theories of rational choice argue that it is personally better to not take part in the collective effort to supply or maintain the good, that one does better for oneself by letting others do the work and then taking advantage of their labors. A choice between giving \$200.00 to my local public television station and watching *Nova* or keeping my \$200.00 and watching *Nova* is not a choice from the rationalist point of view. This is the notion of *free riding* on the efforts of others (P. A. Samuelson, 1954). Because every group member is presented with the same temptation to free ride, the rationalist argument thus predicts that public goods will never be provided. As we saw in the previous paragraph, this prediction is easily refuted by the many real examples of successful provision of goods and resources, as well as the now numerous empirical studies demonstrating that rational choice at best rarely guides human behavior (Fehr & Fischbacher, 2003). It is more accurate to say that public participation in the provision of public goods and maintenance of collective resources is suboptimal.

The questions then become, why is participation suboptimal, and what can be done about it? Fully answering both requires consideration of influences from numerous disciplines—personal economics, for example, will play a role in most contribution decisions, regardless of how much one values the good in question—and collective goods and resources is a topic that is ripe for much cross-disciplinary collaboration. The psychology of involvement with collective goods is also clearly a major force in determining when, and how strongly, people will forgo purely selfish motives and work for the good. An understanding of the psychological factors is thus critical if we are interested in encouraging greater participation in the collective effort.

The purpose of this monograph is to review the major psychological factors affecting the provision of publicly beneficial goods and discuss how the knowledge about these factors can be used to inform policy that is designed to bring more people into the effort to provide and sustain collective goods and resources. Our particular focus will be on two broad classes of variables: those that affect one's willingness to *cooperate* with others, and those that

can induce feelings of *antagonism* toward others, particularly members of out-groups. We will argue that, in some situations, response to collective goods is suboptimal primarily because the actors are not oriented toward cooperation, but in other situations, suboptimal response is mainly because of a dislike of some of the people who would be benefiting from the good or resource. Good policy decisions, then, must take both possibilities into account.

Before reviewing these variables, we need to first review the dynamics of collectively beneficial goods, particularly their structure and how they are perceived. As we noted earlier, such goods are ubiquitous in society, so some examples will also be helpful.

Dynamics of Collective Goods and Resources

Theorists identify two broad classes of collective goods: (a) public goods and (b) common-pool resources. As we will see, both are pervasive in social life, and the typical citizen interacts with them almost daily. Because of their centrality, they have been the focus of research across a number of disciplines for at least 60 years.

Public goods

A *public good* is an entity that requires individuals to contribute some type of capital (money, time, effort) toward its existence. Once enough capital has accumulated, the good comes into existence, and everyone, contributors and noncontributors alike, may use it. Further, the good itself cannot be used up, though future rounds of capital accumulation may be necessary in order to continue provision of the good. As noted earlier, a charity is a classic example of a public good. Charities exist in whole or in large part because of donations, often financial but also through volunteered time and the giving of items for resale. However, if the charity receives enough capital to function, it will help anyone in need, not just those who gave. The Red Cross does not only assist those who have given it money in the past. As well, the charity can usually assist all who need their help. Barring some major catastrophe, we do not run out of the Red Cross. Although delivery of assistance may not be immediate, it will come.¹ There are many examples of public goods. Public broadcasting (financial contributions create programming for all), government (votes create governance for all), and public works (tax dollars create open-use parks, bridges, roads, etc.) are clear examples, but so are clean air (toward which people contribute by reducing production of air pollutants) and nature preserves (through donation of land).

Public goods can be structured in one of two ways. A *discrete* public good is one for which a minimum accumulation of capital must be met, at which point the good is provided in its entirety. It makes no sense, for example, to build half of a bridge. If only enough tax dollars accumulate to cover half of the cost of the bridge, the bridge will not be built. By contrast, a *continuous* public good can be provided in varying amounts; the greater accumulation of capital, the richer the good can be. A public television station that receives less than the targeted amount of donation can still broadcast, but it will not be able to present the expensive shows that viewers most want to see.

Psychologically, public goods present the problem that one has to give now toward something that cannot be used until later. Worse, if one gives, and the good is either not provided (if a discrete good) or is provided at an undesirable level (if a continuous good), one probably cannot have the contribution returned. One's effort, then, has largely gone to waste. Figure 1 demonstrates how each possible outcome is seen from a selfish perspective. Notice that, regardless of what happens with the good, the better personal outcome is realized by withholding contribution. However, also notice that giving and having the good provided is associated with a better outcome than not giving and failing to provide the good. This is a key element that has to be overcome in trying to win support for the public good—we need to shift the focus away from giving versus not giving and toward giving-plus-success versus not giving-plus-failure. In fact, public goods are sometimes referred to as “social fences” because the hurdle of giving must be cleared before the benefits can be experienced. The public good offers the additional key psychological factor that interaction with all others who are involved with the good is at best extremely difficult and often impossible. Thus, each actor has to make assumptions about what others think and try to predict what they will do. Note that this inability to fully communicate often also plagues our next topic, resource management tasks.

Common-pool resources

A common-pool resource can be thought of much like the opposite of a public good. The resource begins at full

provision, and all group members have free access to sample it at either a restricted or unrestricted rate. The sampling reduces the size of the pool, and the pool may or may not be replenished; further, replenishment may be at just a partial rate (i.e., the amount replaced may not equal the amount removed). The dilemma here is that if each person does indeed consistently take as much as she or he can, the resource will decline more quickly than the replenishment mechanism can refill it, and eventually the resource will be exhausted. Thus, although the personally best behavior is to keep taking as much as one wants, the collectively best behavior is to take less than a maximal amount and, more specifically, to yoke one's sampling to the replenishment rate, taking more when replenishment is high and less when it is low. This will allow the replenishment mechanism to replace, or come close to replacing, the amount taken, and this makes the resource last as long as possible. As with public goods, examples of common-pool resources are many. Water, wood, and fish are examples of resources that are partially replenished, whereas oil, minerals, and sand are examples of resources that are functionally not replenished. Note that some of these resources are perishable, and for such resources, spoilage becomes a complicating factor, as it introduces the possibility of underusing the resource: If it is not being consumed quickly enough, a portion of the resource will be ruined. For example, in areas in which the water table is close to the surface, the water level needs to be kept sufficiently below the topsoil such that substances in the soil, like chemical fertilizer and manure, do not leach into the table. In these areas, although abuse of the water table is not desirable, neither is excessive conservation. For many resources, then, determining the proper rate of consumption is a complicated thing.

Although structurally they share much in common (van Dijk & Wilke, 2000), the psychological dynamics underlying common-pool resources are in many ways quite different from those that drive public goods choice. One does not have to worry about putting something into the endeavor only to receive nothing in return—the good is here and available now. You can take what you want, possibly within limits, but almost certainly you will be able to receive an acceptable portion of the entity. In fact, one does not have to commit any personal capital at

	Good is fully provided	Good is not/partially provided
Give	The good minus my donation	(Loss of donation)
Don't Give	The good	Nothing

Fig. 1. Selfish outcome structure of a public good.

all, so the task can be seen as one in which gain is assured. Next, the dependence on others is not obvious: I get what I ask for—what does it matter what others asked for? Also, the time horizon for a common-pool resource problem is usually much greater than it is for a public good. With the partial replenishment of the resource, the decline of the resource occurs over a relatively long period of time, and psychologically this introduces the dynamic of time consideration. For example, even the most pessimistic estimates of how much oil remains untapped suggest that there are at least 100 years of reserves left. This means that we will not see the exhaustion of oil, nor will our children. This is a fact that impacts many people's perceptions of appropriate consumption of resources. Indeed, whereas public goods problems are sometimes referred to as "social fences," common-pool resources are sometimes described as "social traps," because at the start they seem simple to manage—it is only over time that the problem reveals itself. Note that, similar to a public good, complete interaction among the users of the resource is typically impossible. Thus, as with a public good, resource users are ultimately going to have to make assumptions and inferences about what others believe and what they are doing.

Policy concerns

What we have, then, is a social situation that occurs in what appears to be two very different forms, yet presents the same basic problem: a conflict between doing what is best for oneself and what is best for the group as a whole. If we agree that public goods and common-pool resources are desirable things, the question then becomes, what can be done to encourage broader, and more appropriate, engagement with them? Complicating the situation is that citizens are clearly aware of the need to be careful with goods and resources but often demand that multiple standards be met. Specifically, it has been shown that people typically expect all users to be involved in the maintenance of the good or resource, though involved in an efficient manner and with sufficient flexibility that the person can be greedy if need be (Eek & Biel, 2003; C. D. Samuelson, 1993; Wilke, 1991). These goals can be challenging to achieve simultaneously. Policy that is informed by the psychological research into human cooperation gives us our best chance of such achievement. Notably, experts on policy development believe this as well and also feel that the psychological presence has been lacking in even modern attempts to develop good procedures for goods and resource management. For example, A. S. Cheng and Daniels (2005), environmental scientists who demonstrated that public reactions to watershed management policy in Oregon could be explained in part by the

policy administrator's fostering of in-group–out-group perceptions, justified their research by arguing that "Examining the social psychological environment of collaboration can supplement analyses of structural and process features, and advance understanding and practice of collaborative resource management" (p. 31). More generally, E. P. Weber (2008), a political scientist with expertise in environmental policy, wrote:

"researchers interested in developing meaningful, usable lessons for the policy arena need to explore and incorporate models of rationality that depart substantially from traditional 'economic man' models found in the rational choice literature, especially in cases of new governance grounded in community and/or collaborative arrangements" (p. 92).

As well, Reed and colleagues (2010), policy analysts who have evaluated the currently hot desire to bring "social learning" into natural resource management practice, noted that policy makers have chronically failed to consider the psychological research, leading to much confusion over what exactly social learning is and to ignorance of the interpersonal dynamics that might impact such learning. For our purposes, one aspect of their critique is especially noteworthy:

Therefore, assuming that high levels of interaction between stakeholders in any given situation will lead to social learning is simplistic, and a deeper understanding of the context, power dynamics, and values that influence the ability of people and organizations to manage natural resources effectively is necessary (p. r1).

It is clear, then, that at least some scholars who study effective policy making have expressed a strong desire to bring the interpersonal dimension into their theorizing. Our goal is to encourage initial steps in this direction by considering two broad classes of psychological phenomena that are relevant to creation of informed public policy on public goods and resources. First, research into the dynamics of cooperative choice seeks to understand what factors encourage a person to work for the good of the group. By contrast, research on antagonism looks into how dislike between members of distinct groups compromises the ability of those groups to reach mutually beneficial solutions. As we will show, both lines of inquiry have much to say about why behavior toward resources and public goods is as it is, and each presents some ready recommendations for how policy can accommodate both individual cooperative tendencies and intergroup dynamics. We will summarize each line of research

in turn and then discuss and demonstrate the integration of the research into practice.

Cooperation

As we have noted, the decision structure underlying social dilemmas provides decision makers focused on short-term self-interest with strong incentives to behave noncooperatively; namely, such decision makers are always better off when they choose to not cooperate in social dilemmas, regardless of what other decision makers choose to do (i.e., rational decision makers faced with social dilemmas have a dominating strategy dictating noncooperation). Unfortunately, if all decision makers followed this *rational actor reasoning*, public goods would not be provided or would be provided suboptimally and collective resources would be dismally managed. Although we have noted that public goods provision and collective resource management is suboptimal, there are cases when decision makers faced with social dilemmas act in the interest of the group. In this section, we review theories and research that help to explain when and why people will set aside their immediate self-interest and cooperate in the interest of providing and/or maintaining publically beneficial goods. We begin by summarizing broader theories and principles of cooperation in social dilemmas. We then bring together many of these ideas within a new, integrative model of decision making in social dilemmas.

Existing theories of cooperation in social dilemmas

Numerous theories have been offered to explain cooperation in social dilemmas. These theories range in terms of their broad versus narrower scope; their focus on distal motives versus more immediate predictors versus mediating mechanisms; their emphasis on person factors, features of the situation, and/or interactions between different predictors; and their focus on different stages of the decision-making process, such as predecision, behavioral responses to initial levels of cooperation, and/or support for solutions to social dilemmas. In this section, we provide a review of the major theories used to explain cooperation, which we summarize in Table 1.

Overview. We begin by discussing Kelley and Thibaut's (1978) broad interdependence theory, which centers on the idea that cooperation requires decision makers to transform their gut-level self-interested preferences into group serving preferences on the basis of concern with the well-being of others (social concerns) and concern with the long-term consequences of one's actions (temporal concerns). Building on interdependence theory, we

then discuss theories and research on the impact of individual differences in social value orientation (relevant to social concerns), theories and research suggesting that cooperation can be viewed as a form of self-control, and (related) theories and research supporting the role of individual differences in consideration of future consequences (relevant to temporal concerns). Stepping back, we next consider several theories that have been used to understand altruism and cooperation in social dilemmas from an evolutionary perspective. We then discuss the relatively recent appropriateness framework of cooperation in social dilemmas, which emphasizes how features of the situation and person interact to impact perception of the situation, decision rules, and cooperation. We end with a discussion of two theories that explain the conditions under which decision makers are likely to support structural solutions in social dilemmas.

Interdependence theory and the transformation of motivation.

One of the broadest theories used to understand cooperation in social dilemmas (and other interdependent settings) is Kelley and Thibaut's (1978) interdependence theory (cf. Kelley et al., 2003; Van Lange & Rusbult, 2012). To account for deviations from immediate self-interest, interdependence theory assumes that decision makers "transform" the given matrix of objective outcomes into an effective matrix of subjective outcomes that is more closely tied to behavior. The *given matrix* represents individual outcomes determined by the situation in combination with each individual's needs, skills, and so forth, whereas the *effective (transformed) matrix* emerges after decision makers take into account broader social and temporal concerns, including a concern with the well-being of others and/or a concern with the long-term consequences of one's actions.

Social value orientation theories. Within this framework, one variable that has received a great deal of attention is an individual's *social value orientation* (SVO). Traditionally, SVO has been defined in terms of the weight people assign to their own and others' outcomes in settings of interdependence (Messick & McClintock, 1968; Van Lange, Otten, De Bruin, & Joireman, 1997). More recently, Van Lange (1999) supported an (expanded) *integrative model of SVO* suggesting that SVO reflects the weight that interdependent people assign to their own and others' outcomes and the equality in those outcomes. Supporting that model, De Cremer and Van Lange (2001) found that prosocials are more likely than proselves to cooperate in social dilemmas because they feel a strong sense of social responsibility to cooperate (supporting the importance of concern with joint gain) and that prosocials were more likely than proselves to reciprocate the behavior of their partner (supporting the importance of equality).

Table 1. Summary of Psychological Theories and Principles of Cooperation in Social Dilemmas

Name	Description	Key citation
Interdependence theory	Interdependent decision makers transform their gut-level, short-term self-interested preferences (reflected in the objective-given matrix) based on social and temporal concerns into a subjective-effective matrix that is more closely related to behavior.	Kelley & Thibaut (1978)
Integrative model of social value orientation	Social value orientation reflects the weight interdependent partners assign to their own and others' outcomes, as well as equality in outcomes. The model's focus on equality highlights the importance of fairness and reciprocity in social dilemmas.	Van Lange (1999)
Goal prescribes rationality principle	Prosocials view cooperation as rational (and thus they cooperate); proselves view noncooperation as rational (and thus do not cooperate).	Van Lange et al. (1990)
Goal prescribes morality and power principles	Prosocials define morality and power in terms of joint gain; individualists define morality and power in terms of own gain; competitors define morality and power in terms of relative gain.	Joireman et al. (2003)
Might vs. morality hypothesis	Prosocials view cooperation through a moral lens (and thus cooperate); proselves view cooperation through a power lens (and thus do not cooperate).	Liebrand et al. (1986)
Goal-expectation hypothesis	Cooperation requires a cooperative goal and the belief that others will cooperate.	Pruitt & Kimmel (1977)
Goal transformation hypothesis	Prosocials show high levels of cooperation, regardless of social identification; proselves show high levels of cooperation only under high levels of social identification.	De Cremer & Van Vugt (1999)
Interactive model of social value orientation	Social value orientation interacts with context-specific signals of trust and cooperative incentives to predict cooperative goals, expectations, and cooperative behavior; prosocials are highly sensitive to signals of trust; proselves are highly sensitive to incentives for cooperation.	Bogaert et al. (2008)
Cooperation as self-control framework	In iterated dilemmas, with a temporal dimension, cooperation is enhanced when decision makers put aside short-term interests in favor of long-term interests, which requires high state and/or trait levels of self-control.	Dewitte & De Cremer (2001)
Competitive altruism hypothesis	Suggests that altruism can be motivated by a desire to compete with other group members for the title of "most altruistic" in order to gain a reputational advantage.	Hardy & Van Vugt (2006)
Greed, efficiency, fairness hypothesis	Decision makers attempt to strike a balance between greed, efficiency, and fairness, with concerns over efficiency and fairness constraining greed-based desires.	Wilke (1991)
Appropriateness framework	Cooperation centers on the question, what does a person like me do in a situation like this? Answers depend on how decision makers define the situation and interpret their identity in the situation and on the consequential use of decision rules or heuristics.	J. M. Weber et al. (2004)
Structural goal expectation hypothesis	Extension of goal-expectation hypothesis for large groups. Assumes people believe that their ability to influence others to cooperate in large groups is low, raising need for a sanctioning system to reward cooperation and punish noncooperation. Distinguishes between elementary cooperation (original dilemma) and instrumental cooperation (sanctioning system).	Yamagishi (1986)
Multiattribute evaluation model of structural change	Decision makers evaluate structural solutions to social dilemmas in terms of fairness, efficiency, personal interest, and freedom, with the importance of the four dimensions varying as a function of individual differences, including social value orientation.	C. D. Samuelson (1993)

Social value orientation transformations. Figure 2 illustrates how the three most common social value orientations transform a given prisoner's dilemma matrix into an effective matrix on the basis of the value they assign to their own and others' outcomes. In the given matrix on the left, outcomes to self (other) are shown on the bottom (top) of the diagonal. As shown in the given matrix, prior to transformation, from a purely self-ish perspective, the top row dominates the bottom row, as it always provides the best outcome to self, regardless of what the other chooses to do. As can also be seen, following transformation, for individualists (who maximize own gain)² and competitors (who maximize relative gain), the bottom row continues to dominate the top row, as the bottom row provides the highest own and relative gain, respectively. However, for prosocials interested in maximizing joint gain, the top row dominates the bottom row, as the top row provides the highest joint gain, regardless of what the other chooses to do.³ Consistent with this reasoning, over 40 years of research has shown that those with a prosocial value orientation are more likely than individualists and competitors to cooperate in a variety of experimentally created and applied social dilemmas (for reviews, see Au & Kwong, 2004; Balliet,

Parks, & Joireman, 2009; Bogaert, Boone, & Declerck, 2008; Van Lange, De Cremer, van Dijk, & Van Vugt, 2007).

Goal prescribes rationality, morality, and power principles. Several additional theories have focused on mental construal processes that help to explain why prosocials are more likely than proselves to cooperate in social dilemmas. For example, according to *goal prescribes rationality principle* (Van Lange, Liebrand, & Kuhlman, 1990), prosocials view cooperation in social dilemmas as rational whereas proselves (individualists and competitors) view noncooperation as rational (cf. Van Lange & Kuhlman, 1994; Van Lange & Liebrand, 1991). Shifting attention away from rationality, the *might versus morality hypothesis* assumes that prosocials view social dilemmas through a moral framework (and thus choose the moral option of cooperation), whereas prosocials view dilemmas through a power framework (and thus choose the more powerful option of noncooperation) (Liebrand, Jansen, Rijken, & Suhre, 1986; cf. Kuhlman, Brown, & Teta, 1992; Sattler & Kerr, 1991; Van Lange & Kuhlman, 1994). More recently, building on these ideas, Joireman, Kuhlman, Van Lange, Doi, and Shelley (2003) supported *goal prescribes morality* and *goal prescribes power principles* whereby

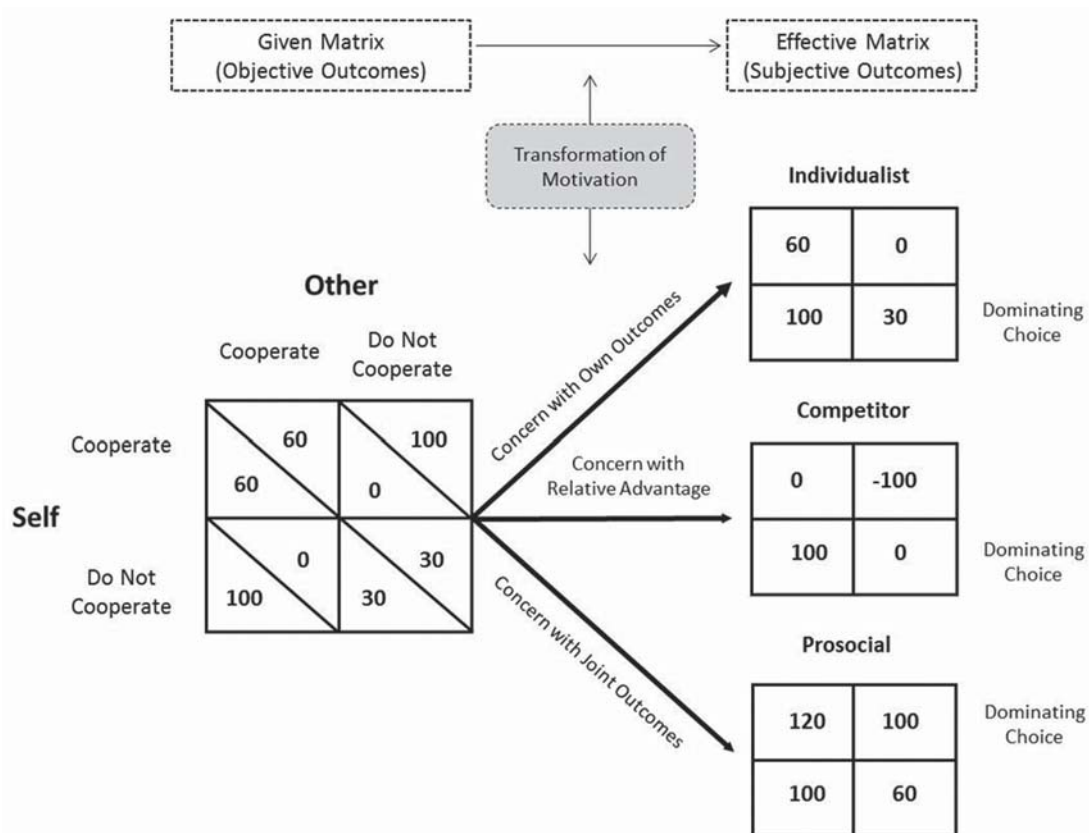


Fig. 2. Three social value orientation transformations of the prisoner's dilemma.

an individual's social value orientation determines how a person defines the most moral and powerful action in interdependent settings (e.g., prosocials define morality in terms of joint gain, individualists define morality in terms of own gain, and competitors define morality in terms of relative gain), and those construals drive choice behavior.

Goal expectation and goal transformation hypotheses. Moving beyond main-effect SVO models, the *goal expectation hypothesis* assumes that cooperation requires both the goal of cooperating (a prosocial value orientation) and the expectation that others will cooperate (Pruitt & Kimmel, 1977), whereas the *goal transformation hypothesis* (De Cremer & Van Vugt, 1999) assumes that prosocials can be encouraged to cooperate when they strongly identify with a group, effectively transforming their self-interested goals into collective goals.

Interactive model of social value orientation. Building on the goal expectation and goal transformation hypotheses, Bogaert et al. (2008) proposed an interactive model of SVO suggesting that prosocials are willing to cooperate as long as they believe their partner is trustworthy, whereas prosocials can be motivated to cooperate assuming incentives are provided that allow them to view cooperation as being in their own interest (either through heightened in-group identity or a long-term horizon; cf. Boone, Declerck, & Kiyonari, 2010), as shown in Figure 3.

Cooperation as self-control. Another perspective views cooperation as a form of self-control (Dewitte & De Cremer, 2001). This theory follows from the idea that many social dilemmas involve both a *social conflict* (individual vs. collective interests) and a *temporal conflict* (short-term vs. long-term interests) (cf. Joireman, 2005; Joireman, Van Lange, & Van Vugt, 2004; Messick & McClelland, 1983; Parks & Posey, 2005), and self-control is often synonymous with choosing to maximize the long-term consequences of one's actions (e.g., Joireman, Balliet, Sprott, Spangenberg, & Schultz, 2008; Rachlin, 2000). More precisely, although the social conflict is by definition present within all social dilemmas, an additional temporal conflict is present in iterated dilemmas, as decision makers make choices in the context of what Axelrod (1984) called the "shadow of the future." Within this framework, features of the person or situation that enhance self-control and/or a concern with future consequences have the potential to encourage cooperation. Indeed, as we review later, a growing body of research shows that self-control and a long-term horizon encourage cooperation.

Evolutionary theories. Scholars have also drawn on evolutionary theory to account for altruism and cooperation in social dilemmas. Theories advanced to understand altruism include kin selection, reciprocal altruism, and competitive altruism. *Kin selection* suggests that people are more likely to help those with whom they share a

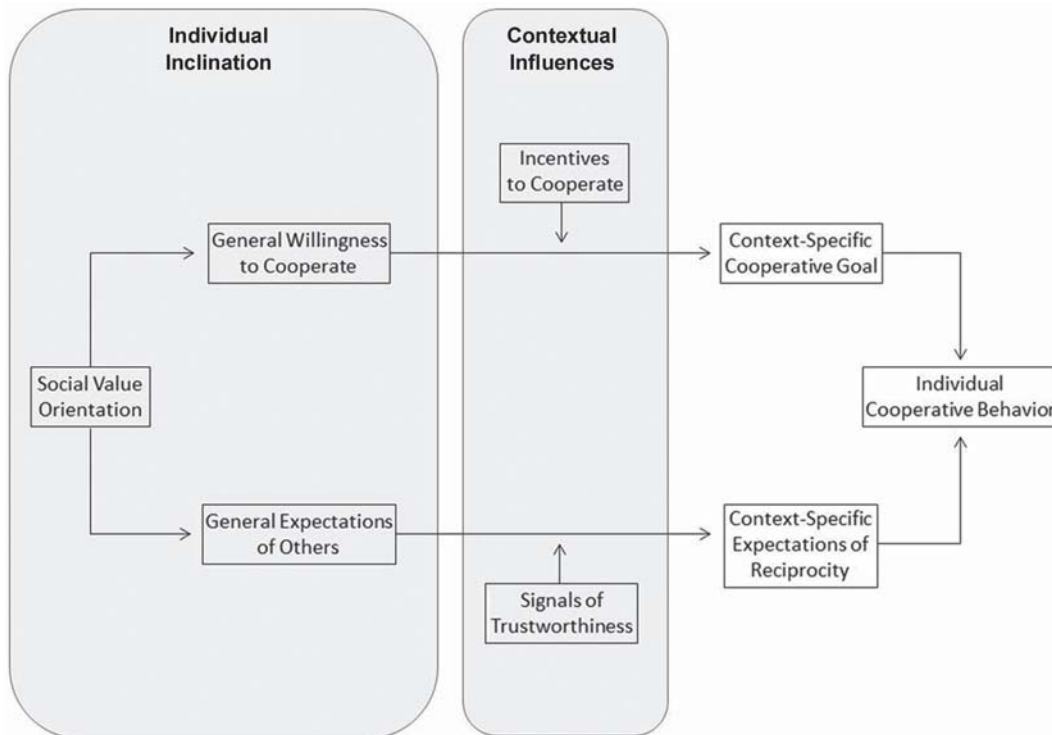


Fig. 3. Interactive model of social value orientation proposed by Bogaert, Boone, and Declerck (2008).

genetic link (Hamilton, 1964); *reciprocal altruism* suggests people are likely to engage in altruistic behavior to gain direct future benefits with the target of their altruism (Trivers, 1971); and *competitive altruism* suggests people compete to be seen as the most altruistic member of a group, as this perception yields reputational benefits to the altruist (e.g., Fehr & Fischbacher, 2003; Hardy & Van Vugt, 2006).

Greed, efficiency, and fairness hypothesis. Another motivational theory suggests that decision makers faced with social dilemmas are tempted to be greedy and behave selfishly, but such short-term self-serving motives are kept in check by considerations of efficiently managing the common resource and concerns over fairness (Wilke, 1991). Originally developed to explain management of common resources, this theory has also been successfully applied to understand contributions to public goods (Eek & Biel, 2003).

Appropriateness framework. A more recent theory advanced to understand cooperation in social dilemmas is the *appropriateness framework* articulated by J. M. Weber, Kopelman, and Messick (2004). The appropriateness framework builds on March's (1994) argument that decisions (in general) can be traced back to three broad factors, including one's definition (or recognition) of a situation (e.g., is this a cooperative task or not?), one's identity (e.g., do I strongly identify with my group?), and the application of various decision rules or heuristics (e.g., do unto others as you would have them do unto you). These three factors culminate in the fundamental question guiding decision making, namely, what does a person like me do in a situation like this? As shown in Figure 4, Weber and colleagues' framework suggests that features of the objective situation impact both the decision maker's identity and how the situation is perceived; though not shown, the model also assumes that identity is driven by a decision maker's personal history (e.g., family influences, development); the decision maker's identity then alters how the situation impacts perception of the situation and how perception of the situation impacts choice of decision rules, which then impacts the final decision.

As an example, consider groups of students at rival high schools who are competing to see which school can collect the most food for a food bank's yearly food drive. This is a classic public goods dilemma, as each student could (if necessary) benefit from the food bank's services, regardless of whether the school donated food during the food drive. The intergroup competition to provide a public good represents a feature of the situation that is likely to enhance students' identification with their school. This heightened in-group identification would, in turn, redefine the situation and enhance the perceived benefits of donating to the school's food drive (converting a standard public goods dilemma situation into a perceived cooperative task; cf. Bornstein & Ben-Yossef, 1994; Brewer & Kramer, 1986). Once defined as a cooperative task, the decision maker's identification would further impact the selection of appropriate decision rules; for example, when my school is competing against our rival school, everyone (as good soldiers) pitches in and goes "above and beyond the call of duty" (a heuristic that encourages the student to bring in large amounts of food).

Support for structural change. Finally, many studies have attempted to identify means of solving social dilemmas. Two approaches to solving social dilemmas have typically been differentiated (Messick & Brewer, 1983): *Individual solutions* attempt to influence individual-level decision making, without necessarily altering the incentive structure of the original social dilemma (e.g., via appeals to conscience), whereas *structural solutions* represent collective action aimed at altering the decision-making authority (e.g., by electing a leader) or altering the incentive structure of the decision (e.g., by making the cooperative response more attractive). Of the two types of solutions, structural solutions are generally viewed as more promising. As such, a number of studies have explored factors that influence people's support for structural solutions to social dilemmas.

Structural goal expectation hypothesis. An extension of the goal expectation hypothesis for large group dilemmas was proposed by Yamagishi (1986). Yamagishi argued that in order to be motivated to cooperate, people

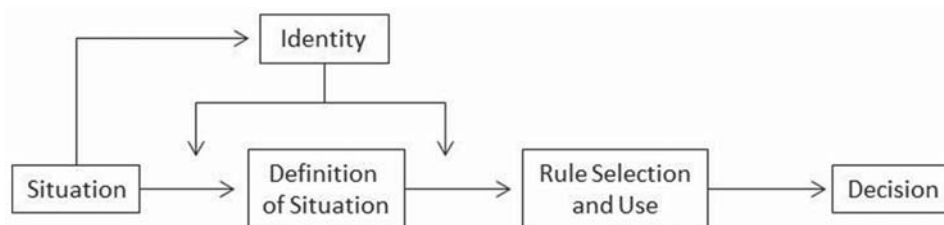


Fig. 4. Appropriateness framework proposed by J. M. Weber, Kopelman, and Messick (2004).

need to believe they have the ability to influence each other's behavior, for example, through rewards and punishments. Although this is possible in small groups or dyads, it is much less possible in large groups. Accordingly, Yamagishi argued that in large group dilemmas, people must initially struggle to discover that (elementary) cooperation is futile. Once they arrive at this realization, people will become motivated to implement a sanctioning system responsible for rewarding cooperation and punishing noncooperation. The need for the sanctioning system then introduces a secondary social dilemma, in which group members must decide whether to engage in instrumental cooperation by contributing to the sanctioning system.

Multiattribute evaluation model of support for structural change. Another approach to understanding support for structural solutions is C. D. Samuelson's (1993; C. D. Samuelson & Messick, 1995) *multiattribute evaluation model* of structural change in social dilemmas. Because structural solutions to social dilemmas often involve transition costs from the certain status quo to the less certain "solution," Samuelson argued that decision makers must believe that the solution will afford sufficient benefits along several dimensions, including efficiency, self-interest, fairness, and freedom. Samuelson further assumed that the importance of such dimensions will vary as a function of individual differences in, for example, social value orientation.

Integrative model of decision making in social dilemmas

Over the past 40 years, a large social dilemmas literature has emerged testing a wide range of theoretically and practically driven questions. In the current section, we offer a new, integrative-process model of decision making in social dilemmas that reflects key insights from this vast body of research. Our model, shown in Figure 5, reflects the various theoretical perspectives summarized earlier and underscores several practical implications for policy makers interested in promoting contributions to the public good (broadly defined).

Overview. For organizational purposes, the model is broken down into four broad stages, including relatively distal causes, more proximal causes and decision making processes, an initial social dilemma interaction, and consequences of the initial interaction. At the center of our model is Kelley and Thibaut's (1978) argument that cooperation is enhanced when decision makers transform their gut-level, self-interested (given matrix) preferences into an effective matrix based on broader social and temporal considerations. With this assumed, the model

begins by highlighting factors that affect the given matrix (features of the decision itself) and factors affecting the transformation from given to effective matrix (personal histories, culture, evolutionary motives, and the immediate social situation).

The model next assumes that the effective matrix preferences can affect a decision maker's intention to cooperate via two routes, a more deliberate route, through which the consequences of one's actions are carefully considered, and a more automatic route, whereby decision making is driven by heuristics or rules of thumb (cf. J. M. Weber et al., 2004). The model then distinguishes between intended level of cooperation and actual level of cooperation to account for the possibility of positive or negative noise (i.e., factors outside of the decision maker's control that lead actual contributions to be higher or lower than intended; Van Lange, Ouwerkerk, & Tazelaar, 2002).

Actual level of cooperation (a function of own and others' behavior) then leads to relevant outcomes for self and others (own, others', relative, and joint gain), and relevant outcomes in turn lead to various reactions to those outcomes (rewards, punishments, adoption of structural solutions), with the impact of the outcomes on reactions based on a range of personal moderators (e.g., attributions regarding success and failure, trait forgiveness). Finally, assuming an iterated dilemma, responses to the initial interaction feed into subsequent proximal decision processes and choice behavior.

Individual differences. In line with the appropriateness framework's emphasis on personal histories (see Fig. 4), our model begins by highlighting three distinct personality traits that (theoretically and empirically) give rise to a predisposition to cooperate in social dilemmas, including SVO (Messick & McClintock, 1968; Van Lange et al., 1997), trust (Yamagishi, 1986), and consideration of future consequences (CFC; Joireman, Shaffer, Balliet, & Strathman, 2012; Strathman, Gleicher, Boninger, & Edwards, 1994).⁴ As noted earlier, individual differences in SVO bear on how people resolve the social conflict underlying social dilemmas (individual vs. collective interests); individual differences in CFC bear on how people resolve the temporal conflict in social dilemmas (short-term vs. long-term consequences); and trust is relevant to Pruitt and Kimmel's (1977) goal expectation hypothesis, which assumes that cooperation requires both the goal of cooperating and the expectation that others will also cooperate. Consistent with our model, research has shown that social value orientation is largely distinct from trust (e.g., Joireman, Van Lange, Kuhlman, Van Vugt, & Shelley, 1997; Parks, 1994) and CFC (e.g., Joireman, Lasane, Bennett, Richards, & Solaimani, 2001; Joireman, Van Lange, et al., 2001), and trust and CFC are

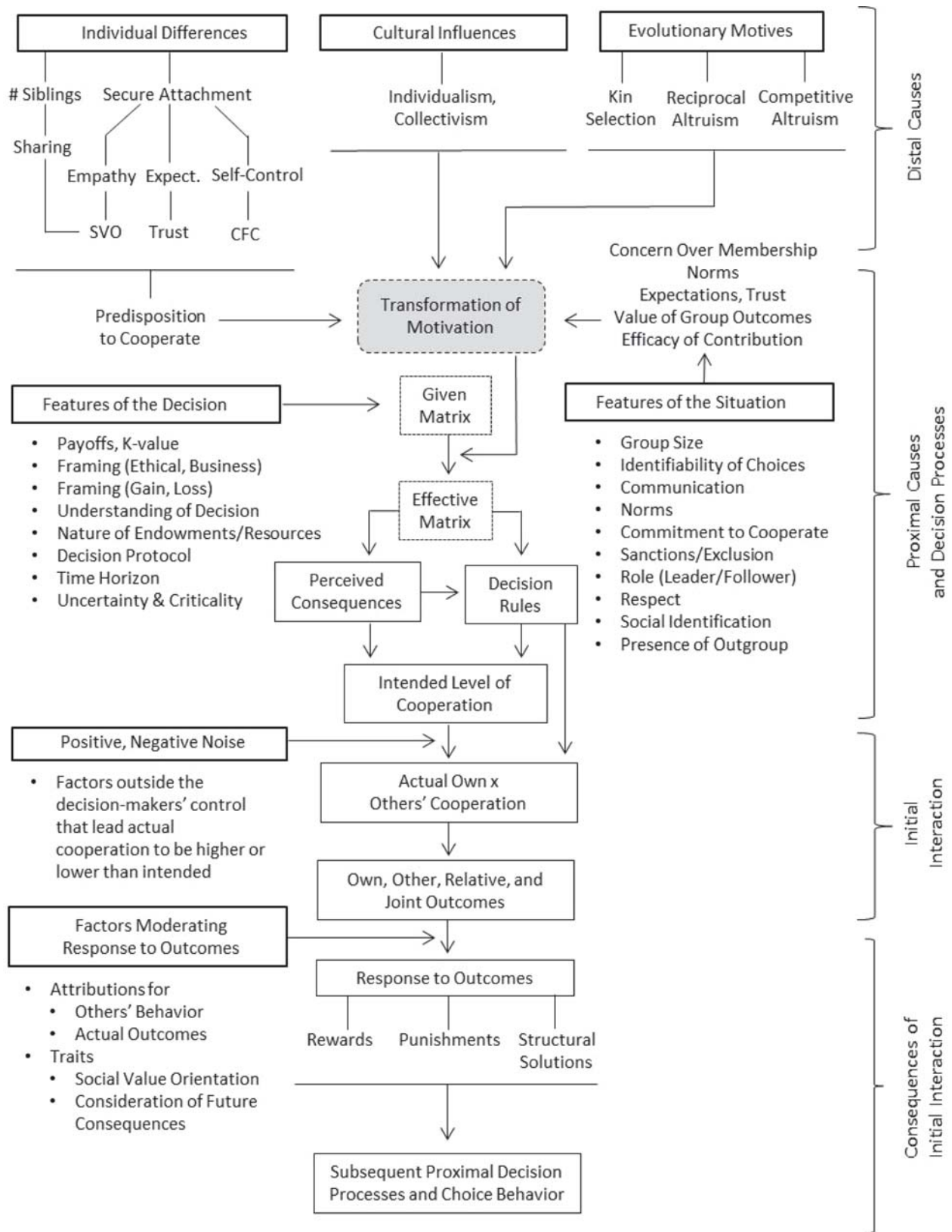


Fig. 5. Integrative model of decision making in social dilemmas. SVO = social value orientation; CFC = consideration of future consequences.

likewise distinct (Joireman & Van Lange, 2012). Below, we review the main effects of each disposition and discuss secure attachment as a common developmental precursor of the three dispositions. Later in the article, we explain how several features of the situation moderate the impact of SVO (in particular) on cooperation in social dilemmas.

Social value orientation. As noted earlier, individual differences in SVO reflect the weight decision makers assign to their own outcomes, others' outcomes, and equality in outcomes in settings of interdependence (Messick & McClintock, 1968; Van Lange, 1999; Van Lange et al., 1997). Although an infinite number of SVOs are possible (Griesinger & Livingston, 1973), three types of SVOs are typically distinguished: *prosocials* (who maximize joint gain and equality), *individualists* (who maximize own gain), and *competitors* (who maximize relative gain), with individualists and competitors often combined into a broader category of *proselfs*.

The vast body of SVO literature clearly shows that prosocials are more likely than proselfs to cooperate in a variety of experimentally created social dilemmas (for reviews, see Au & Kwong, 2004; Balliet et al., 2009; Bogaert et al., 2008; Van Lange, De Cremer, et al., 2007; cf. De Dreu, Weingart, & Kwon, 2000).

Complementing this experimental work, many studies also support the impact of SVO across a wide range of theoretically relevant applied settings. As an example, prosocials are more likely than proselfs to volunteer for experiments (McClintock & Allison, 1989; Van Lange, Schippers, & Balliet, 2011), donate to charity (Van Lange, Bekkers, Schuyt, & Van Vugt, 2007), engage in proenvironmental behavior (Joireman, Lasane, et al., 2001), express stronger preferences for public transportation (Van Vugt, Meertens, & Van Lange, 1995), coordinate (i.e., sync) their behavior with an interaction partner (Lumsden, Miles, Richardson, Smith, & Macrae, 2012), and be perceived as cooperative solely on the basis of their nonverbal behavior (Shelley, Page, Rives, Yeagley, & Kuhlman, 2009).

Trust. Another important individual difference variable that impacts cooperation in social dilemmas is trust, typically defined as the belief that others are honest and that trusting them is (not) risky (cf. Yamagishi, 1986). For example, those high in trust are more likely than those low in trust to contribute to public goods (Parks, 1994; Yamagishi, 1986), especially when the payoff structure contains a high degree of fear (Parks & Hulbert, 1995); to increase cooperation in response to a partner's stated cooperative intentions (Parks, Henager, & Scamahorn, 1996); and to reduce consumption of a common resource when it is threatened (Messick et al., 1983). Conversely,

those low in trust are more likely than those high in trust to support a sanctioning system punishing noncooperation (Yamagishi, 1986) and reduce cooperation in response to a partner's stated intention to not cooperate (Parks et al., 1996).⁵

Consideration of future consequences. A final trait relevant to cooperation in social dilemmas is the consideration of future consequences, defined as "the extent to which people consider the potential distant outcomes of their current behaviors and the extent to which they are influenced by these potential outcomes" (Strathman et al., 1994, p. 743; cf. Joireman et al., 2012). Indeed, several studies have shown that individuals high in CFC are more likely than those low in CFC to cooperate in experimentally created social dilemmas (e.g., Joireman, Posey, Truelove, & Parks, 2009; Kortenkamp & Moore, 2006), to engage in proenvironmental behavior (e.g., Joireman, Lasane, et al., 2001; Strathman et al., 1994), to prefer commuting by public transportation (e.g., Joireman et al., 2004), and to support structural solutions to transportation problems when they believe the solution will reduce pollution (Joireman, Van Lange, et al., 2001).

Development of SVO, trust, and CFC. Although a full treatment of the development of SVO, trust, and CFC is beyond the scope of the present article, from a policy standpoint, it is worth considering some key developmental drivers of these traits. To begin, there is evidence that a prosocial value orientation is more likely to develop when one grows up with a large number of siblings and when people develop a secure attachment (Van Lange et al., 1997). These findings make sense, given that families with large numbers of siblings require greater sharing and a secure attachment gives rise to empathy (Joireman, Needham, & Cummings, 2002), which in turn is associated with a prosocial value orientation (Declerck & Bogaert, 2008). In addition to encouraging empathy, a secure attachment leads to a more positive working model of, and higher trust in, others (e.g., Collins & Read, 1990), as well as higher self-control (Tangney, Baumeister, & Boone, 2004), which in turn is positively related with CFC (Joireman et al., 2008). In sum, it seems clear that SVO, trust, and CFC are partly rooted in early experiences with one's primary caregiver.

Cultural influences. Cooperation in social dilemmas has also been shown to vary as a function of the extent to which people place value on individual versus group outcomes (i.e., individualism versus collectivism). For example, Parks and Vu (1994) found much higher rates of cooperation among a Vietnamese sample than among an American sample, whereas Hemesath and Pomponio (1998) found higher rates of cooperation

among a Chinese sample than an American sample (Probst, Carnevale, & Triandis, 1999). In a more recent study, Wong and Hong (2005) showed that priming Chinese American biculturals with Chinese (vs. American) symbols led to increases in cooperation with friends (but not strangers).

Evolutionary motives. Our model also highlights three evolutionary motives for engaging in altruistic behavior (i.e., behavior that benefits others at a cost to oneself; Van Vugt & Van Lange, 2006). According to kin selection theory (Hamilton, 1964), humans maximize the likelihood of passing down their genes to future generations by helping those with whom they share a genetic connection. Consistent with this reasoning, people are more likely to help relatives than strangers (e.g., Burnstein, Crandall, & Kitayama, 1994). Another theory proposed to explain altruism is Trivers's (1971) reciprocal altruism theory, which assumes that altruism may have developed through reciprocal strategies of helping. Indeed, the norm of reciprocity is a powerful predictor of cooperative behavior (Fehr, Fischbacher, & Gächter, 2002), especially among people with a prosocial value orientation (e.g., De Cremer & Van Lange, 2001). Finally, drawing on costly signaling theory (Zahavi & Zahavi, 1997), several studies suggest that generosity is used as a costly signal capable of generating reputational benefits and future cooperation (e.g., Hardy & Van Vugt, 2006; Iredale, Van Vugt, & Dunbar, 2008; E. A. Smith & Bliege Bird, 2000; Van Vugt & Hardy, 2010).

Individual differences, culture, and evolutionary motives represent meaningful precursors to cooperation in social dilemmas. Also important are features of the decision itself and the social context in which the decision is made. In the following sections, we highlight features of the decision and situation with practical policy implications.

Features of the decision. Although social dilemmas possess a common underlying structure, they vary significantly in terms of the actual payoffs available, whether the decision represents a public goods (give some) or commons (take some) dilemma, how the decision is framed (e.g., business vs. ethical decision), and whether the decision makers anticipate making a single decision or repeated decisions over time. Moreover, decision makers may vary in terms of their own resources or their understanding of the dilemma, the requirements for providing a public good, or the size and/or replenishment rate of a common resource.

Incentive structure. As we summarize in Table 2, research on these issues provides a number of important insights for encouraging cooperation in social dilemmas. First, cooperation is higher when the decision structure

makes incentives for cooperation high, by reducing either the fear of being exploited or the temptation to exploit others. Two of the more creative approaches to this problem were explored by Dawes, Orbell, Simmons, and van de Kragt (1986), who attempted to reduce fear through refundable contributions and greed through enforced contributions (in the event that the remaining members of the group provided the public good). Results supported the benefits of eliminating greed but not fear. However, other studies have shown that eliminating fear increases cooperation, most notably within resource dilemmas and among those low in dispositional trust (Parks & Hulbert, 1995).

Decision framing. The framing of the dilemma can also impact cooperation. For example, cooperation is reduced when decision makers view the social dilemma as a business decision rather than as an ethical decision (Tenbrunsel & Messick, 1999) or a social decision (V. Liberman, Samuels, & Ross, 2004; Pillutla & Chen, 1999). Moreover, framing the dilemma as a public goods (give some) versus a commons can also impact cooperation, but as De Dreu and McCusker (1997) showed, the direction of such framing effects appears to depend on the instructions given and the social value orientation of the decision maker. In sum, cooperation rates are lower in give-some than in take-some dilemmas when instructions to the dilemma emphasize individual gain or decision makers have an individualistic value orientation, whereas cooperation is higher in give-some than in take-some games when instructions emphasize collective outcomes or decision makers have a prosocial value orientation.

Experience with and understanding of the dilemma. Decision makers' understanding of the dilemma has also been shown to be an important factor influencing cooperation levels. When decision makers have a clear understanding of the dilemma (Hopthrow & Abrams, 2010), they have greater information about others' decisions (Jorgenson & Papciak, 1981; Sell & Wilson, 1991), or they have had prior success coordinating their actions with others (Knez & Camerer, 2000), cooperation is enhanced.

Nature of endowments and common resources. Another feature of the decision that can impact cooperation is the way people think about their initial endowments or community resources. For example, in a public goods context, when people believe they have worked hard for their endowments, they are less likely to contribute to the public good (Muehlbacher & Kirchler, 2009) or follow an equal contribution rule (van Dijk & Wilke, 1994). Decision makers sharing access to a common resource are also less likely to cooperate if those resources are initially framed as private (as opposed to community) property (van Dijk & Wilke, 1997).

Table 2. Features of the Decision Impacting Cooperation in Social Dilemmas

Feature of decision	Impact	References
Incentive structure	Cooperation enhanced when fear and/or greed is reduced	Dawes et al. (1986); Pruitt (1967); Rapoport (1967); Rapoport & Eshed-Levy (1989)
Framing as business vs. economic decision	Cooperation enhanced when social dilemma decisions are framed (or perceived) as ethical or social decisions rather than business decisions	V. Liberman et al. (2004); Pillutla & Chen (1999); Tenbrunsel & Messick (1999)
Framing as give-some vs. take-some dilemma	Framing effects are inconsistent and moderated by SVO: Prosocials cooperate more in give-some (vs. take-some) framing; individualists cooperate more in a take-some (vs. give-some) framing	De Dreu & McCusker (1997)
Experience with and understanding of dilemma	Cooperation enhanced when decision makers better understand dilemma and others' choices and have had prior success coordinating their actions	Hopthrow & Abrams (2010); Jorgenson & Papciak (1981); Knez & Camerer (2000); Sell & Wilson (1991)
Nature of endowments	Contributions to public goods reduced when decision makers have worked hard to earn their money	Muehlbacher & Kirchler (2009); cf. van Dijk & Wilke (1994)
Framing initial resources as community vs. private property	Framing initial resources in a commons dilemma as community property (vs. private property) increases cooperation	van Dijk & Wilke (1997)
Decision protocol	Cooperation lower if decision makers believe they are making decisions sequentially and are the first to make a decision	Abele & Ehrhart, (2005); Au & Ngai (2003); Budescu, Au, & Chen (1997)
One-shot vs. iterated dilemmas	Cooperation enhanced when decision makers believe they will be interacting over a series of trials, especially among proselves	Sell & Wilson (1991); Van Lange, Klapwijk, & Van Munster (2011)
Environmental uncertainty	Cooperation reduced when uncertainty over size of common resource or replenishment rate is high, especially when accountability is low, and among proselves	de Kwaadsteniet et al. (2006, 2007); Gustafsson et al. (1999); Roch & Samuelson (1997)
Provision point uncertainty	Cooperation reduced when uncertainty over provision point of a step-level public good is high, especially when size of group is uncertain	Au (2004); Wit & Wilke (1998)
Perceived criticality	Cooperation enhanced when people believe their cooperation is critical to group's success	Au et al. (1998); Chen et al. (1996)

Note: SVO = social value orientation.

Decision protocol and time horizon. The order in which people make their decisions and the anticipated duration of their interaction also play a role in cooperation. When people make decisions sequentially, for example, those who make decisions early in the sequence show lower levels of cooperation (a first mover advantage; e.g., Abele & Ehrhart, 2005; Budescu, Au, & Chen, 1997; Budescu, Suleiman, & Rapoport, 1995). Cooperation is also higher when people anticipate future interactions with their partner or members of their group (Sell & Wilson, 1991), most notably among those with a prosel orientation (Van Lange, Klapwijk, & Van Munster, 2011).

Uncertainty and criticality. A final set of factors related to the decision that affect cooperation deal with uncertainty over the resource, actions necessary to provide the public good, or one's own ability to impact the final outcome. In resource dilemmas, for example,

consumption is higher when there is uncertainty over the replenishment rate (Roch & Samuelson, 1997) or the size of the resource (Gustafsson, Biel, & Gärling, 1999), especially among proselves (de Kwaadsteniet, van Dijk, Wit, & De Cremer, 2006) and when personal accountability is low (de Kwaadsteniet, van Dijk, Wit, De Cremer, & de Rooij, 2007). In public goods dilemmas, uncertainty (over the provision point) can also reduce cooperation (Au, 2004), especially when the size of the group is uncertain (Wit & Wilke, 1998). Finally, related to the notion of uncertainty, research finds that decision makers are more likely to cooperate when they perceive their contribution to be more critical to the group's success (Au, Chen, & Komorita, 1998; Chen, Au, & Komorita, 1996).

Features of the situation. As noted in our model, features of the decision largely give rise to the perceived payoffs in the given matrix, though some, such as an

extended time horizon, are likely to impact the transformation from given to effective matrix (e.g., by making the long-term consequences of cooperation more apparent). As we summarize in Table 3, and discuss later in this article, another class of variables impacting transformation from given to effective matrix involve social and contextual factors, such as group size, the possibility of communication, and the presence or absence of sanctions.

Group size. One of the most obvious features of the situation with potential to impact cooperation is group size. Indeed, it has long been recognized that people exert less effort toward group tasks when working as a group than when working alone (Karau & Williams, 1993) and are less likely to help others when in the presence of a large group (Fischer et al., 2011). Though exceptions exist (e.g., Liebrand, 1984), cooperation in social dilemmas has also been shown to decrease as a function of group size (e.g., Brewer & Kramer, 1986; Hamburger,

Guyer, & Fox, 1975; Komorita & Lapworth, 1982). Several mechanisms likely explain why members of large groups show reduced effort and/or cooperation, including a lack of perceived efficacy (Kerr, 1989), a perception that one's contribution is dispensable (Kerr & Bruun, 1983), reduced identifiability (Karau & Williams, 1993), or a reduced ability of other group members to engage in reciprocal strategies that encourage cooperation (e.g., tit for tat; Komorita, Parks, & Hulbert, 1992).

Identifiability of choices. Closely related to the last two potential group size mechanisms is the notion that cooperation is likely to be greater when one's contribution can be identified. In fact, several social dilemma studies support this argument (e.g., Fox & Guyer, 1978; Jerdee & Rosen, 1974; Van Vugt & Samuelson, 1999). Research also suggests that identifiability is especially likely to encourage cooperation among those low in dispositional trust and high in self-monitoring (De Cremer, Snyder, & Dewitte, 2001). De Cremer and colleagues explained

Table 3. Features of the Situation Impacting Cooperation in Social Dilemmas

Feature of situation	Impact	References
Group size	Cooperation and effort toward group tasks is lower in larger groups.	Brewer & Kramer, (1986); Hamburger et al. (1975); Karau & Williams, 1993; Komorita & Lapworth, 1982
Identifiability of choices	Cooperation and effort toward group tasks are enhanced when choices are identifiable.	De Cremer et al. (2001); Fox & Guyer (1978); Jerdee & Rosen (1974); Karau & Williams (1993); Van Vugt & Samuelson (1999)
Communication	Communication enhances cooperation, with the effect larger for spoken (vs. written) communication and in large groups.	Balliet (2010)
Norms	Cooperation is enhanced when cooperative norms are present, especially when normative group is similar to self.	Bicchieri (2002); Biel & Thøgersen (2007); Cress & Kimmerle (2007); Parks et al. (2001)
Stated commitment to cooperate	Pledging a commitment to cooperate enhances cooperation.	Chen (1996); Chen & Komorita (1994); Kerr et al. (1997); Kerr & Kaufmann-Gilliland (1994)
Sanctions	Rewards for cooperation and punishments for noncooperation enhance cooperation, especially in iterated dilemmas involving same partners.	Balliet et al. (2011)
Threat of exclusion	Cooperation is enhanced when exclusion from the group is possible.	Cinyabuguma et al. (2005); Kerr et al. (2009)
Role in group (leader or follower)	Leaders take more of a common resource than followers, with differences larger among appointed leaders and among proselves.	De Cremer & van Dijk (2005, 2008); Stouten et al. (2005); van Dijk & De Cremer (2006)
Respect and justice	Cooperation is enhanced when group members are shown respect and treated fairly by leaders	De Cremer (2002); De Cremer & van Knippenberg (2002, 2003)
Social identification	Cooperation is enhanced when decision makers strongly identify with group, especially among proselves.	Brewer & Kramer (1986); Buchan et al. (2011); De Cremer & Van Vugt (1999); Kramer & Brewer (1984); Wit & Kerr (2002)
Presence of out-group	Intragroup cooperation is enhanced when competing against an out-group, especially among men.	Bornstein et al. (1989); Gunnthorsdottir & Rapoport (2006); Van Vugt et al. (2007)

their results by suggesting that accountability increases concern with social evaluation and the belief that others will cooperate, both of which encourage cooperation.

Communication. Another critical feature of the situation that impacts cooperation is the opportunity to communicate. Indeed, in his meta-analysis on the effects of communication on cooperation in social dilemmas, Balliet (2010) concluded:

After roughly sixty years of [social dilemma] research, no magic bullet has arrived in the arsenal for attacking such problems and resolving these conflicts. However, if there is any single solution that has harnessed the most support and reduced the most conflict, it must be communication between participants in the social dilemma. (p. 40)

Balliet's meta-analysis suggested that communication has a large overall positive effect on cooperation, with the effect stronger in large groups, and when communication is face to face as opposed to written, though both types of communication showed large and significant positive effects on cooperation.

Norms and commitment to cooperate. One of the most likely explanations for the impact of communication on cooperation is that communication establishes norms favoring cooperation (e.g., Bicchieri, 2002; Kerr, Garst, Lewandowski, & Harris, 1997). Indeed, norms are powerful determinants of cooperation in social dilemmas (e.g., Biel & Thøgersen, 2007; Cress & Kimmerle, 2007), with people especially likely to model their level of cooperation on the behavior of similar others whose past actions led to large outcomes (Parks, Sanna, & Berel, 2001). Communication also affords decision makers an opportunity to state a personal commitment to cooperate (Orbell, van de Kragt, & Dawes, 1988), which several studies show increases cooperation in social dilemmas (Chen, 1996; Chen & Komorita, 1994; Kerr & Kaufman-Gilliland, 1994). Notably, when others in a group commit to cooperate, such stated commitments increase cooperation only among those high in trust (Parks et al., 1996). As noted earlier, it appears that in order to cooperate, those low in trust must be concerned about social presentation (high in self-monitoring) and convinced that cooperation level is identifiable.

Sanctions and exclusion. Norms are powerful determinants of behaviors, in large part because choosing to follow or not follow group norms carries significant consequences. Within social dilemmas, cooperation is often rewarded with future cooperation and noncooperation is similarly reciprocated (Kelley & Stahelski, 1970). Given their importance, many researchers have studied

the impact of rewards and punishments on cooperation. In their meta-analysis of the literature, Balliet, Mulder, and Van Lange (2011) reported that rewards and punishments have roughly equal (medium size) effects on cooperation in social dilemmas, with effects larger in iterated dilemmas involving repeated interactions with the same partner(s). The larger effect of sanctions in iterated dilemmas makes sense, as repeated interactions allow decision makers to pursue a tit-for-tat strategy, which is highly effective at encouraging sustained cooperation (Axelrod, 1984), especially among individualists (Kuhlman & Marshello, 1975) and, given enough time, even competitors (Sheldon, 1999). Research also suggests that the timing of rewards and punishments matters insofar as prosocials are most likely to cooperate when their cooperation is immediately reciprocated, whereas competitors are most likely to cooperate when punishment for noncooperation is delayed (Parks & Rumble, 2001). Finally, related to the notion of rewards and punishments, research finds that cooperation is higher when there is a threat of being excluded from a group (Cinyabuguma, Page, & Putterman, 2005; Kerr et al., 2009).

Leaders, followers, and respect. The roles people adopt within groups can also affect cooperation in social dilemmas. For example, De Cremer and colleagues have shown that leaders take more of a common resource than followers because leaders feel more entitled to behave selfishly (De Cremer & van Dijk, 2005). What is interesting is that the tendency for leaders to take more than followers is stronger when the leader has a proself value orientation (De Cremer & van Dijk, 2006) and when there is a high degree of variability among group members' harvests (Stouten, De Cremer, & van Dijk, 2005); furthermore, this tendency emerges only when the leader has been appointed (as opposed to democratically elected) (De Cremer & van Dijk, 2008), because elected leaders feel a stronger social responsibility to act in the interest of the group. With regard to leaders and followers, De Cremer and colleagues have also shown that cooperation is enhanced when leaders treat followers with respect (De Cremer, 2002) and maintain a high degree of procedural justice (De Cremer & van Knippenberg, 2002, 2003).

Social identification. A long line of research also suggests that cooperation in social dilemmas is enhanced when group members strongly identify with their group (Brewer & Kramer, 1986; Buchan et al., 2011; Kramer & Brewer, 1984; Wit & Kerr, 2002). One explanation for these findings is that a strong sense of social identification transforms an individual's concern with his or her own well-being into a concern with the larger collective, thus encouraging cooperation. Support for this argument comes from studies testing the *goal-transformation hypothesis* (De Cremer & Van Vugt, 1999), which suggests

that social identification should have a stronger positive impact on proselves. The logic underlying the goal transformation hypothesis is that whereas prosocials tend, by default, to value the group's welfare and cooperate in social dilemmas, proselves must be encouraged (via high levels of social identification) to view their own interests and the group's interests as closely aligned. Consistent with this reasoning, several studies have shown that social identification has larger positive effects among proselves than among prosocials (De Cremer & van Dijk, 2002; De Cremer, Van Knippenberg, van Dijk, & Van Leeuwen, 2008).

Presence of an out-group. One feature of the situation that encourages group members to strongly identify with their in-group is the presence of an out-group. Thus, the presence of an out-group should theoretically give rise to higher intragroup cooperation. In fact, several studies have shown that people are more likely to cooperate in social dilemmas when they are members of a group that is in competition with an out-group (e.g., Bornstein, Rapoport, Kerpel, & Katz, 1989; Gunthorsdottir & Rapoport, 2006). Drawing on an evolutionary framework, Van Vugt, De Cremer, and Janssen (2007) argued that the increase in intragroup cooperation in the presence of a competing out-group should be most pronounced among men. Supporting their *male warrior hypothesis*, men were more likely to contribute to public goods when competing with an out-group than when not (because the presence of an out-group enhanced social identification), whereas women's level of cooperation was relatively unaffected by the presence of a competing out-group.

Noise. Beyond precursors, as our model makes clear, any attempt to understand cooperation should recognize a distinction between intended and actual level of cooperation, as it is not uncommon that a decision maker's actual level of cooperation is affected by factors outside of his or her control (i.e., noise). Although positive noise is possible (i.e., cooperation is higher than intended), the majority of research has focused on the detrimental effects of negative noise (i.e., when cooperation is lower than intended). This research clearly shows that negative noise leads to reduced cooperation in a give-some game (Van Lange et al., 2002) and reduced willingness to manage a common resource responsibly, especially among prosocials facing a diminishing resource (Brucks & Van Lange, 2007), even though they are a group normally inclined to conserve diminishing resources (Kramer, McClintock, & Messick, 1986). Negative noise can also "spill over," reducing cooperation in subsequent dilemmas that contain no noise (Brucks & Van Lange, 2008).

Although negative noise is problematic, steps can be taken to reduce or eliminate its adverse consequences.

For example, when negative noise is present, impressions of one's partner and cooperation can be enhanced if decision makers adopt a generous response strategy (e.g., responding in a slightly more generous fashion than the partner did on the preceding trial; Klapwijk & Van Lange, 2009; Van Lange et al., 2002), when decision makers have the opportunity to communicate (Tazelaar, Van Lange, & Ouwerkerk, 2004), and when decision makers are encouraged to be empathetic (Rumble, Van Lange, & Parks, 2010).

Consequences of initial interaction. The final part of our model focuses on the consequences of the initial interaction in social dilemmas. As noted earlier, it is common for groups faced with social dilemmas to encourage cooperation by reciprocating the behavior of their partners, rewarding cooperation, and punishing noncooperation (e.g., Balliet et al., 2011; Komorita et al., 1992). Decision makers faced with poor outcomes in social dilemmas may also adopt any number of individual or structural solutions to the social dilemma (Messick & Brewer, 1983). Individual solutions aim to influence individual-level decision making, without altering the incentive structure of the social dilemma (e.g., via appeals to conscience or communication), whereas structural solutions alter the decision-making authority (e.g., by electing a leader), rules for accessing the common resource, or the incentive structure of the decision (e.g., by making the cooperative response more attractive). As structural solutions are generally considered the most effective, in this section, we consider research focusing on support for structural solutions to social dilemmas.

Among experimental social psychologists, the most commonly studied structural solution is election of a leader who can manage the decision-making process. Numerous studies have shown that decision makers are more likely to elect a leader when the group has failed to achieve optimal outcomes in a social dilemma (e.g., underprovided a public good or overused a common resource; Messick et al., 1983; Rutte & Wilke, 1984; C. D. Samuelson, Messick, Rutte, & Wilke, 1984; Van Vugt & De Cremer, 1999). Additional research shows that in the face of collective failure, willingness to elect a leader tends to be higher in commons (as opposed to public goods dilemmas; e.g., van Dijk, Wilke, & Wit, 2003; cf. Rutte, Wilke, & Messick, 1987), when collective failure is attributed to the difficulty of the task (as opposed to greed; C. D. Samuelson, 1991), and among those with a prosocial (vs. a prosself) orientation (De Cremer, 2000; C. D. Samuelson, 1993). Research comparing different leadership alternatives has shown further that group members are more likely to support democratic (than autocratic) leaders, especially when group identification is high (Van Vugt & De Cremer, 1999) and to stay in groups led by

democratic (vs. autocratic) leaders (Van Vugt, Jepson, Hart, & De Cremer, 2004).

Although willingness to elect a leader increases under collective failure, when given a choice between electing a leader and other solutions (e.g., majority rule, privatization), the leader option is not universally the most preferred. Rutte and Wilke (1985), for example, examined support for five different solutions (large majority, unanimity, small majority, status quo, and electing a leader) in a commons dilemma in which people believed the resource was overused, optimally used, or underused and harvest variability was either high or low. Averaging across all conditions, the leader option was the least popular. However, in the case of overuse and high harvesting variability, the leader option was the most popular. In a study simulating overuse of a common resource, C. D. Samuelson (1993) found the leader option to be the least popular (vs. equal privatization, a harvest cap, and the status quo).

Regardless of the type of solution, when determining whether to support structural solutions to social dilemmas, C. D. Samuelson (1993; Samuelson & Messick, 1995) argued that decision makers must be convinced that the proposed solution offers benefits above the status quo. Specifically, Samuelson proposed that decision makers evaluate structural solutions along four dimensions—efficiency, self-interest, fairness, and freedom—with the importance of each varying as a function of individual differences (e.g., in social value orientation or consideration of future consequences). Samuelson's model has received support in both the lab (C. D. Samuelson, 1993) and the field (Joireman, Van Lange, et al., 2001; Van Vugt, 1997).

Finally, research on structural solutions to social dilemmas has been significantly advanced by Ostrom and her colleagues, who have studied the development of institutions designed to manage common pool resources (e.g., Ostrom, 1990; Ostrom, Gardner, & Walker, 2003). In sum, Ostrom and colleagues' work indicates that management of common resources at the local level is very fruitful, because small local groups are able to develop tailored rules and regulations that match local conditions, which provide clarity in usage expectations, help people monitor adherence to those rules, and provide mechanisms for negotiating ongoing modifications to those rules that match changing conditions.

Antagonism: A Barrier to Cooperation

The preceding section makes clear that human cooperation is a rather frequent occurrence and in many situations can be induced with relatively little trouble. This work, however, presumes that relations among the participants are positive or at least neutral. But often,

situations that require cooperation contain an element of negativity. There may be dislike among group members or between subgroups. There may be power dynamics that encourage members to try to force others to do things in a particular way. These are situations in which *antagonism*, or oppositional behavior toward others, plays a role. The emphasis here is on the overt nature of the behavior. In antagonistic mixed-motive situations, one or more participants are actively trying to prevent success of the collective endeavor. Contrast this with selfishness, under which one merely wants to do as well for oneself as possible. In fact, the selfish person would like the endeavor to be successful—she or he simply does not want to contribute toward its success.

In this section, we will focus on those situations in which people are purposely trying to prevent the common good from being provided or the common resource from being well maintained. Rather than being puzzling hotheads, we will see that there are identifiable psychological principles underlying the motivation of such individuals.

Gatekeepers

Consider the following example: A common grazing area has been partitioned so that each of four ranches may use one quarter of the land for its cattle. The area has a pond, a barn, and a grove of shade trees. The location of the area allows for only a single entry gate—the area cannot be ringed by a road. The partitioning is done in such a way that each rancher has one of the amenities (pond, trees, barn, gate) on his or her parcel, and there are gates allowing access to each adjacent parcel. On the surface, this seems to be an effective solution to the classic “tragedy of the commons” problem—privatize the commons so that each party has some grazing land and one of the amenities—and in fact it is a solution that is often advocated for resource management problems (though its effectiveness is questionable, as privatization can sometimes encourage abuse by fostering a “this is mine and I can do what I want with it” mentality; van Dijk & Wilke, 1997). As the amenities are things that all of the ranchers need—the pond for water, the trees for shade, the barn for shelter and to tend to injured animals, and the gate just to get to one's land—we would expect the parties to work out a sharing scheme such that each rancher can get access to any amenity whenever he or she needs it. But now imagine that the rancher on whose land the pond sits decides to lock all of the access gates for his or her property. This rancher's animals can still drink, but none of the animals from the other ranches can drink, effectively rendering the other three plots of land useless. The rancher demands a water fee from each other ranch and will remove the locks only once every rancher has

paid the fee. In response, the rancher who controls the access gate locks that, and now none of the other ranchers can even get to their pieces of land. A seemingly effective solution for promoting cooperative land use has been ruined.

Situations like this occur often in society, and they are referred to as *anticommons dilemmas*. Heller and Eisenberg (1998) documented how intellectual property falls into the anticommons trap by using the example of gene fragments. It is legal for biomedical research firms to seek patents on DNA sequences before identifying the function of that sequence. If another research unit later has an idea about what that sequence might do, it has to first get permission of the patent holder to conduct the research, permission that typically comes with a large price tag attached. The second research firm is trying to produce knowledge that can help humanity, which is a type of resource, but the patent holder has built a dam across the flow of knowledge and needs to be well-compensated before removing the dam. Similarly, Cadigan, Schmitt, Shupp, and Swope (2011) showed how urban deterioration and sprawl can result from an anticommons trap, when attempts to consolidate land fail because the owner of one parcel of land demands excessive compensation. The consolidation will either be abandoned, resulting in deterioration, or will have to be worked around, producing sprawl.

As a real example of the anticommons, the saga of the Ridpath Hotel in Spokane, Washington, is illustrative. Originally built in 1900 as a luxury hotel and rebuilt in 1951 after a fire, by 2008 it had closed because of a crumbling infrastructure and need for major renovation. The deed holder elected to sell the building in units, originally 29 different ones, later consolidated to 19, with the idea that the building would become a multiproperty facility, and no one person would be completely responsible for the recapitalization. The parceling and consolidation was done haphazardly, in such a way that certain units are accessible only by passing through other units. For example, one unit is the restaurant space on the top floor, and another is the top two residential floors, directly beneath the restaurant—including the elevator shaft. Further, particular building-wide necessities were included as parts of certain parcels. For example, one unit includes the building's water heating system. As of this writing, at least six different parties own pieces of the Ridpath, and disagreements between them are such that the building stands empty, and there is not even enough cooperation to allow workers to access particular areas to make necessary repairs. As a result, the city is deliberating whether to declare the entire property a public hazard and mandate its destruction. (See Vestal, 2011, 2012, for a complete discussion of the Ridpath.) This is a classic example of an anticommons problem. Each owner has

the ability to restrict usage of the resource by the other owners, and as a result, a useful resource (the property is in a prime location in downtown Spokane, and the city has indicated that the downtown needs both more hotel rooms and more private residential space) is being wasted.

The obvious question to ask is, why would people act in this way? Why hold a resource hostage? Although the anticommons situation is only just now receiving research attention, the few studies that do exist suggest that greed is a significant motivator. Those who control the anticommons tend to demand a higher price for access than their estimate of the entity's value (Vanneste, Van Heil, Parisi, & Depoorter, 2006). So although the rancher with the pond might see the value of the pond as \$10,000 per rancher, he or she would demand \$15,000 per rancher to remove the locks. It can be argued that the gatekeeper demands a higher price to compensate for a loss, but as Dhont, Van Heil, and De Cremer (2012) pointed out, the gatekeeper is not losing anything—the rancher who removes the locks can still water his or her cattle, and the biotech company can use the DNA sequence however they like. Further, those who are exploited in the anticommons tend to see gatekeepers as being unconcerned with moral behavior, oriented toward personal gain, unaware of the impact of their behavior on others, and unafraid of how their actions might impact the resource (Van Heil, Vanneste, & De Cremer, 2007). Fennell (2011) has argued that a gatekeeper position is potentially so lucrative that participants in the dilemma will compete for the right to be one.

The role of power. A concept that comes out of the literature on coalition formation, and which we believe is relevant here, is the notion of *pivotal power* (Shapley & Shubik, 1954). Those with pivotal power have the ability to determine the final outcome from the interaction. Imagine that \$1,000.00 is needed to make some endeavor happen, and three people pool their money and end up \$100.00 short. A fourth person arrives, with \$100.00, and is invited to join the group. This person is said to have pivotal power, because his or her decision to join or walk away will completely determine whether the endeavor is successful. Those with pivotal power are seen as worrisome because they have the potential to demand high levels of compensation in exchange for their cooperation, and there is some evidence that such critical people do indeed benefit from their position, though not as completely as might be expected (e.g., Kravitz, 1987).

We suggest that anticommons situations exist because each participant in the commons has pivotal power. Each person has the ability to determine whether others benefit from the commons or not. The advantage of thinking of an anticommons as a situation of mutual pivotal power

is that we can draw on the vast literature on interpersonal power to help us understand how the anticommons situation develops in the first place. Within an anticommons, pivotal power can be seen as a form of coercive power—if you do not give me what I want, I will not give you the access that you need. Mutual coercive power in mixed-motive situations is counterproductive when it is excessively applied (De Dreu, 1995), and in general, those with coercive power often worry about retaliation by their targets if the coercion is too aggressive (Molm, 1997). As such, it is often the case that those with coercive power apply just enough to produce the desired behavior in others. The psychological brake that retaliation engages seems to be a fear of loss, specifically a worry that one's outcomes will decrease from the current amount if the target retaliates (Handgraaf, van Dijk, Vermunt, Wilke, & De Dreu, 2008; Molm, 1997). This suggests that the reference point is a critical factor—"If I apply too much power, my outcomes will go down relative to what I get now, and I don't want that to happen"—and reference points are indeed a key influence in mixed-motive decision making (Fleishman, 1988). However, fear of loss should not be an issue in an anticommons situation, because no outcomes are being received. The participants cannot do worse than they are doing right now. The owner of the restaurant space at the Ridpath Hotel cannot use the space—how could things be any worse than that? There should thus be no fear that maximum application of one's coercive power will cause problems for oneself.

The anticommons dilemma, then, is a situation in which there is widespread use of coercive power against each other's interaction partners. Because everyone is using power against everyone else, conditions that encourage such behavior actually grow—as none of us can use the resource, there is nothing to lose by being excessively threatening. In effect, the situation devolves to a multiperson game of chicken (Bornstein, Budescu, & Zamir, 1997), in which everyone is waiting for someone else to make the first move, all the while heading toward a very bad outcome. Unfortunately, breaking a chicken-like situation is a challenge. Communication between the participants seems to be completely ineffective (Bornstein & Gilula, 2003), and participants tend to hold the belief that others do not have the willpower to hold out as long as they can, further emboldening them to stick to their current behavior (Bornstein, Mingelgrin, & Rutte, 1996). However, Dhont et al. (2012) found that gatekeepers will become more responsive to the collective good when they are made aware that others are being negatively affected by their actions, and along these lines, those with power tend to be driven by their sense of social responsibility when confronted with others who are completely powerless (Handgraaf et al., 2008; van Dijk &

Vermunt, 2000). This all suggests that a way to break the anticommons might be to focus attention away from the participants and toward those who have no say in the matter but are negatively impacted anyway.

Gatekeepers in public goods situations. A similar situation exists within the public goods provision. A form of the good known as a *step-level* public good is one for which a certain total amount of contribution is needed before the good can be provided. Consider a bridge on a walking trail that is going to be built through donations. It makes no sense to build half of a bridge, so provision of the bridge has to wait until enough money has been donated to fully cover the cost, at which time the entire thing is provided.⁶ Theorists often point to government as an example of a step-level public good, as laws cannot be passed unless a certain vote threshold (often a simple majority) is reached, but once it is reached, the law impacts everyone (e.g., Offerman, Sonnemans, & Schram, 1996).

One aspect of the step-level public good is the *critical contributor*. When accumulated contributions approach the target total, undecided individuals begin to gain power to determine whether the good is provided. If, for example, \$100.00 more is needed to build the bridge, and I have \$100.00 to give, I have the power to determine whether the bridge gets built. If I do not give, it is not built, and if I do give, it is built. Although it is sensible for the critical contributor to give, because having the good is better than not having the good (Rapoport, 1987), in fact critical contributors often withhold their contribution. One explanation for this is utility-based, in that these individuals will give only if they believe that their contribution will enhance the expected utility of the good beyond some threshold (Al-Najjar & Smorodinsky, 2000). In other words, it is not enough to act merely to make the good a success; the pivotal person will give only if his or her contribution will have an outsized impact on the endeavor. A related possibility is that these persons recognize the pivotal power they hold and decide to exercise it, perhaps demanding compensation for their contribution or using the power to demonstrate their superiority over those who support provision of the good (Sachdev & Bourhis, 1991). This is an especial problem if the critical contributor belongs to a group that could benefit from failure of the endeavor (R. H. Smith, Powell, Combs, & Schurtz, 2009).

To see these ideas in action, consider the 2011 fight within the United States Congress over increase of the debt ceiling. The increase was needed to allow the government to continue to meet its financial obligations, including debt interest, Social Security, and federal salaries. Normally a routine maneuver (it has been raised 68 times since 1960, 39 times since 1980), in 2011 Republicans

and some Democrats seized on the issue as a way to push for major spending cuts and refused to vote for it. As Republicans controlled the House of Representatives, this meant the increase could not move forward and gave House Republicans pivotal power. As Social Security, the military, and the like are types of public goods, it follows that House Republicans were critical contributors—if they gave their votes, the goods would be provided, and if they withheld their votes, the goods would not be provided. Republican senator Mitch McConnell went so far as to describe the debt ceiling as “a hostage worth ransoming” (Jenkins, 2011). This provides a good demonstration of awareness that one’s criticality can be used to extract rewards from those interested in seeing the good provided (McConnell’s comments) and that pivotal power can be used to foster an impression of superiority.

So we see that there are situations in which individuals can thwart the common good, perhaps because of a power play or a desire to demonstrate superiority over others. The other actors believe that the person is motivated by greed and lack of awareness of or concern about the impact of his or her actions. Our examples document that these kinds of situations do occur in everyday society.

Out-group harm. The preceding section demonstrates that people will sometimes impede the development of cooperation because of goal-driven reasons or, more specifically, to receive something in exchange for their cooperation: acclaim, acknowledgment of strength, or a tangible payoff. Another impetus toward anticooperative behavior is dislike for an out-group that is involved in the endeavor and would stand to benefit from the cooperation. In our previous example of the debt ceiling conflict, it is almost a certainty that some Republicans who opposed the increase did so because they wanted to make the Democrats and President Obama look bad. Although it can be argued that this is a foolish approach, because it hurts one’s in-group as well, as we will see, those who are motivated to bring harm to an out-group are not necessarily concerned with how their in-group is impacted. They just do not want an out-group to experience a benefit.

In-group/out-group biases. A fundamental principle in social psychology is that people tend to favor their in-groups over out-groups. Given the ability to allocate resources among the two groups, people rarely offer an equal split and typically show considerable favoritism to the in-group (Brewer, 1999). Often this favoritism is driven by a desire to provide as much to one’s fellow group members as possible (“in-group love”), but sometimes it is motivated by a desire to deny beneficial outcomes to out-group members (“out-group hate”; Brewer,

1999). Further, people make in-group/out-group distinctions constantly and sometimes on the basis of trivial factors. Researchers reliably create out-group perceptions in subjects by informing them that the Other liked a painter whom the subject did not care for, or Other guessed too low on an estimation task when the subject guessed too high (see Diehl, 1990, for a review of such studies). Given this, it would not be surprising if, within a common-pool resource or public goods problem, people sense that others who do not share in-group affiliation with themselves will benefit from the good or resource and then also realize that they have the ability to block provision of the good or to deplete the resource. As a result, they execute such blocking, because they want to deny out-group members the ability to benefit. Again, one can point out that, in behaving like this, one also denies one’s in-group members the benefit of the good or resource, but it is important to remember that those motivated by out-group hate simply do not see the situation in this way. They will accept a suboptimal outcome for themselves or their group, if it means creating an even worse outcome for the out-group.

One might ask why people would choose to behave like this, given that their in-group will also be harmed by their failure to cooperate. In fact, this question can be answered from a variety of perspectives. Recall from our discussion of social value orientation in the previous section that there is a class of people, Competitors, for whom personal payoff is less motivating than the relative difference in payoffs between self and others. Competitors will happily accept a suboptimal personal outcome if by doing so, they realize a maximum outcome advantage over others. For a Competitor, a result of \$300.00 to self and \$50.00 to Other is preferable to a result of \$1,000.00 to self and \$900.00 to Other, because the former produces a larger difference between outcomes than does the latter. (We are not saying that out-group hate equates with competitiveness—in fact, De Dreu, 2010, found that those with a cooperative orientation are just as willing to engage in out-group hate as Competitors. Rather, we are saying that it is not unthinkable, or even unusual, that someone would forgo maximum personal gain in order to bring harm to an out-group.) Earlier we showed that social value orientation develops from childhood experiences and various social interactions. From this perspective, then, someone who focuses on denying the out-group access to a beneficial good or resource does so because she or he has learned that this is an effective strategy for accomplishing interpersonal goals. Although it can be pointed out to Competitors that they are forgoing a much better outcome that would be realized through cooperation, Competitors would likely respond by saying that they have learned through experience that such outcomes are not realistic or readily attainable.

Denying access to others is the best strategy in the long run.

An evolutionary perspective can also be taken on why one might try to deny benefits to an out-group. Choi and Bowles (2007) suggested that *parochial altruism* is a beneficial trait. Parochial altruism occurs when an individual acts in a hostile manner toward members of another group, forgoing maximum personal benefit in the process but producing a net benefit for members of his or her in-group. From this perspective, acting to prevent out-group members from benefiting from a good or resource is done for a larger purpose, namely, to deliver some greater benefit to one's in-group. Thus, the Republican who refuses to support an increase in the debt ceiling, and in the process incurs the displeasure of a large segment of the public, is doing so to bring a larger ultimate benefit to the Republican Party, perhaps enhancement of its reputation as a party of fiscal watchdogs.

Related to this, Jensen (2010) suggested that sometimes out-group harm serves the functional purpose of encouraging the out-group to change its ways (and note that researchers have argued that revenge can serve the same function—e.g., Tripp & Bies, 1997), but at other times out-group harm is produced in order to level the playing field: The in-group believes that the out-group is making substantial gains, and so out-group harm is inflicted in order to rein in their advancements. The in-group may suffer in the process, but their losses are not as severe as the out-group losses. Here, it could be that Republicans opposed the debt ceiling increase in order to encourage Democrats to alter their approach to government funding, but it could also be that Republicans perceived the Democrats to be performing better than they were in the political arena and blocked the increase in order to stem those gains. The Republicans would be hurt, too, but they hoped not as severely as would the Democrats.

Research into preference for in-group benefit versus out-group harm in mixed-motive situations has, happily, shown that the former is by far the more common motivator of behavior (Halevy, Weisel, & Bornstein, 2012). Left to their own devices, people just prefer to do right by their own group and let other groups do what is best for themselves. Indeed, when one group seems to be acting to harm another, members of the targeted group tend to assume that the behavior is a function of the situation—in other words, the other group is trying to harm us because they have no choice (Halevy et al., 2012). An important caveat to this principle exists, however: If a group is cognizant of the relative standing of one group compared with another, actions directed toward harming the out-group increase. This is true when the in-group feels disadvantaged relative to the out-group (Halevy, Chou, Cohen, & Bornstein, 2010) but also when an

advantaged in-group is competing with an out-group whom the in-group feels does not deserve to be involved in the situation (McPherson & Parks, 2011). Indeed, McPherson and Parks found that out-group harm was most likely to be performed by a high-status, advantaged in-group against a low-status, disadvantaged out-group—a type of “kick them when they are down” effect. So there are clearly situations in which a person might refuse to work for the common good, even if that person's efforts are critical: Perhaps such individuals do not feel that their actions will be sufficiently acknowledged, or perhaps they are driven primarily by a desire to bring harm to an out-group.

What evidence is there that participants in a social dilemma might think of at least some other participants as being members of an out-group? In fact, research suggests that such perceptions are likely and quite easy to induce. To take just a couple of examples, Bornstein and Ben-Yossef (1994) were able to produce reliable in-group/out-group distinctions within a social dilemma paradigm simply by telling people that some participants were in the red group and the rest were in the green group. (They further found, in their control condition, that people expected members of the other group to be motivated primarily by self-interest.) De Cremer and Van Vugt (1998) got similar effects by telling group members that some participants in the social dilemma were from their own university, and others were from a different university. There also exist data that may document in-group/out-group distinctions in a more naturalistic setting. L. R. Anderson and Mellor (2009) assessed religiosity, including affiliation and frequency of attendance of services, and also had people engage in a public goods task. They found a negative correlation between frequency of church attendance and amount contributed to the good. The relationship remained even after controlling for religious denomination. Anderson and Mellor explained the effect by arguing that frequent attenders would have a strong sense of in-group identity and would thus want to give just to projects that benefit that in-group. Because it was unclear to the subjects who the other participants in the dilemma were, frequent attenders would tend to assume that at least some other members were affiliated with different denominations (i.e., would be out-group members), and the frequent attenders would be uninterested in supporting projects that benefit such people. Hence, their levels of cooperation were low. Along these lines, Preston, Ritter, and Hernandez (2010) argued that religion is oriented around protection of one's in-group, so the especially devout should be more basically oriented toward in-group support than the less religious; Johnson, Rowatt, and LaBouff (2012) provided empirical support for this notion. It is, then, entirely plausible that those engaged in a social dilemma might look at the

situation as involving in-groups and out-groups and that those distinctions can impact degree of cooperation.

Emotions. A key factor in the poor treatment of out-groups is the principle of *infrahumanization*, or the belief that out-groups are somehow less human than one's in-group. Such a belief makes it psychologically easier to justify poor treatment of the out-group—they are not as “human” as we are, so being brutal to them is not the same thing as being brutal to an actual person. Infrahumanization is largely accomplished by assuming that out-group members are emotionally simple. In particular, out-groups are believed to experience primary emotions (e.g., anger, pleasure) but not secondary ones (e.g., love, hope, guilt, humiliation; Leyens et al., 2000). The distinction is important, because the primary emotions are thought to be experienced by all organisms of sufficient neural complexity, whereas the secondary emotions are uniquely human (Demoulin et al., 2004). Thus, the out-group is seen to be emotionally quite primitive. What is important for our purposes is that the tendency to infrahumanize an out-group seems to arise only when the out-group somehow has relevance to one's in-group (Castano & Giner-Sorolla, 2006). Cortes and colleagues (Cortes, Demoulin, Rodriguez, Rodriguez, & Leyens, 2005) have argued that interdependence is the key factor in determining whether infrahumanization will occur. So we would expect some Republicans to see Democrats as lacking in secondary emotions, but they would likely not have this same reaction to the Australian Labor Party, as the Australian party has no impact on Republican success or failure. As the very nature of a mixed-motive setting is that all people are partially dependent on the others, it follows that the person who perceives in-group/out-group distinctions within the social dilemma would likely expect out-group members not to experience secondary emotions, which makes them less sophisticated than we are, in turn making it more acceptable to look out for ourselves and not work with them.

Van Vugt and Park (2009) have argued that infrahumanization is a necessary component of out-group antagonism, regardless of level of severity of the antagonism, in that it is easier to mistreat out-group members if one assumes they are not quite as human as the members of one's in-group. Van Vugt and Park suggested that an aspect of such an assumption is the expectation that the out-group represents a general threat.⁷ Some support for this notion can be found in Maner et al. (2005). These researchers enhanced a self-protection motive in White subjects and then showed them pictures of faces of White, Arab, and African American men. All of the faces had expressions that a pilot sample had judged as emotion-neutral, and the subjects detected this in the White

faces, but they evaluated the African American and Arab faces as showing angry expressions. Thus, when people (or at least men) are of a mindset to protect, they seem inclined to detect antagonism in out-group members, even where it does not actually exist. People who see in-group/out-group distinctions in a social dilemma often think in terms of protecting in-group interests (Bornstein, 2003); given Maner et al.'s (2005) results, we would expect such people to see hostile intent in most actions the out-group undertakes. An out-group member taking a larger-than-typical amount from a resource, for example, would likely be interpreted as having a lack of concern for the collective welfare, rather than this consumption being perceived as need-based or perhaps the result of a reasoned calculus that the resource can absorb the larger harvest.

A number of studies support the notion that when noncooperation occurs in situations of interdependence, perceptions that “they are emotionally different” can play a role. For example, although guilt can be an effective instigator of cooperation in people (de Hooze, Zeelenberg, & Breugelmans, 2007; Ketelaar & Au, 2003; Nelissen, Dijker, & de Vries, 2007), learning that others feel guilty about a lack of cooperation can actually make people less likely to increase their rate of cooperation (Van Kleef, De Dreu, & Manstead, 2006; Wubben, De Cremer, & van Dijk, 2008). Van Kleef et al. (2006) found that those low in trust tended to discount others' expressions of bad feelings about their behavior. Van Kleef et al. attributed this reaction to suspicion that others were being duplicitous, but it is possible that low trusters were skeptical that others could feel guilty about their actions, a notion that is in line with the infrahumanization idea. As well, it is notable that in Wubben et al.'s (2008) study, people expected that guilt in others would merely lead others to behave as they should have been behaving all along; the guilt would not make them highly cooperative. This is a more benign notion, but it is still evidence that people do not think secondary emotions will have the impact on cooperation in others that it does in themselves.

Regarding another secondary emotion, shame, De Jong and colleagues (De Jong, Peters, De Cremer, & Vranken, 2002) found that opponents who blushed after making a noncooperative choice were perceived as untrustworthy, and on subsequent trials subjects failed to cooperate with the blusher. De Jong et al. explained the result by suggesting that the blush was an involuntary signal that the Other knew that she or he had done something unacceptable (as opposed to naively producing a noncooperative choice); in other words, the Other had made a calculated decision to be selfish. This is certainly possible, but the infrahumanization research has shown that out-group members who show secondary emotions are perceived more negatively and provoke more overtly

hostile reactions than those who show only primary emotions (Vaes, Paladino, Castelli, Leyens, & Giovanazzi, 2003). Again, this is not direct evidence that people in social dilemmas think of others as out-group members and act to try to harm them, but it is compatible with such a notion.

Finally, Vaes and colleagues (Vaes, Paladino, & Magagnotti, 2011) looked at emotional appeals made by political in-groups and out-groups and found that people were more willing to respond to a secondary emotional appeal made by a member of their own political group than by a member of another political group. The primary reason given by subjects for not responding to the out-group appeal was a disbelief that “those people” could really experience the emotion they were claiming to experience. As we have noted, political subgroups are dependent on each other for the government to function, so these results are relevant to our argument that unwillingness to cooperate with an out-group can be driven by emotional factors.

Association of public goods with out-groups. A “public” good is called such because it can be used by any group member. But what happens if the good comes to be associated with a particular subgroup? A classic example of such an association is public broadcasting, which political conservatives tend to see as containing programming that is heavily skewed toward liberal interests (Kropf & Knack, 2003). In such situations, members of the nonassociated group may come to believe that they either cannot use the good, because it contains nothing of value for them, or should not use the good, because they will be stigmatized with the quality that associated group possesses. Thus, conservatives may feel that public television is useless because it broadcasts no shows of interest to them or that if they watch public broadcasting, other conservatives will suspect that they have liberal qualities. On the other side, an expanded and well-maintained road system is a public good that tends to be associated with conservatives. A liberal who advocates for the creation of new roads may thus fear that liberal colleagues will see a large network of roads as encouraging urban sprawl and discouraging public transportation. Examples of a guilt-by-association principle abound. To present just a few, Swim, Ferguson, and Hyers (1999) found that heterosexual women would endorse sexist statements that a lesbian opposed, so as to avoid others thinking that they themselves were lesbian. Argo and Main (2008) found that people who shop with others who use low-value coupons are themselves thought to be cheap. Hebl and Mannix (2003) showed that a normal-weight job applicant who appears at an interview in the company of an overweight person will be assumed by the interviewer to have the same negative

qualities that are stereotypically assigned to the overweight and overall be less likely to be recommended for hire.

From this perspective, then, refusal to support provision of a public good, and in fact active opposition to it, is due to the good being seen as belonging to “them”: Public television is a liberal thing, a broad system of roads a conservative thing. Because there is social risk in being connected to the out-group, it follows that the in-group member should run from any appearance of supporting the good and in fact may actively root for its elimination, which would remove any danger of accidental association. (As an example of such an accident, consider that, in the days after saying during the first 2012 presidential debate that he liked PBS, Republican Mitt Romney was taken to task on conservative Web sites for the comment, despite the fact that he went on in the debate to say that he would nonetheless end funding of PBS.) This also implies that public goods will have their best chance of being supported if they are group-neutral, with no obvious connection to any subgroup.

In-group antagonism and deviants. We have seen that people can be, and often are, antagonistic toward out-group members, and this works against the development of cooperation. The research we have considered also clearly documents that, while people can be antagonistic toward the out-group, at the same time they tend to be quite cooperative with in-group members (e.g., Bornstein & Ben-Yossef, 1994). However, there are conditions that can lead to antagonism toward one’s own in-group members, and this form of antagonism has the potential to ruin that in-group cooperation. Termed the *black sheep effect*, the work shows that in-group members who deviate negatively from in-group norms provoke hostile evaluations by their fellow group members, and in fact the evaluations are more severe than evaluations of any out-group deviant (Marques, Abrams, Paez, & Hogg, 2003). Originally focused on in-group members who deviate negatively from the norm, recent work has shown that people will also be hostile toward those who deviate positively (i.e., they do more than the norm calls for), and critically, people will actually take steps to punish positive deviants (Herrmann, Thoni, & Gächter, 2008) and may even try to remove them from the group (Parks & Stone, 2010). Antagonism toward positive deviants has been shown across a number of cultures (Herrmann et al., 2008), and although it is unclear why it occurs, Parks and Stone (2010) suggested that it may be due to concerns about the positive deviant raising the standard for expected behavior or to the mere fact that the person is a deviant, as people are uncomfortable associating with deviants of any type. Regardless of cause, the phenomenon is problematic for the development of

cooperation, because it not only chases away those who want to be especially giving toward the collective good, it has the potential to discourage others from increasing their own efforts. Recent field studies of resource use by citizens seem to document this, with people not wanting to deviate from the norm for fear of arousing the displeasure of others (Velez, Stranlund, & Murphy, 2009).

Poor treatment of volunteers. The in-group antagonism problem is similar to one observed earlier by Snyder, Omoto, and Crain (1999) regarding volunteers who assist the stigmatized. They found that people who volunteer to work with AIDS patients often become stigmatized by the work, with others assuming that the volunteers themselves must have AIDS, and the stigmatization is often sufficiently unpleasant that they end their volunteer participation. In support of this argument is the fact that AIDS volunteers who had large social networks were found to be more likely to quit than were those who had small social networks, the assumption being that the AIDS volunteerism produces more fundamental disruption to social relations as the size of the network grows (Snyder & Omoto, 2000). A similar problem may also arise with volunteers who work with cancer patients (Remmer, Edgar, & Rapkin, 2001), the mentally ill (Sadow, Ryder, & Webster, 2002), or sex workers (Phillips, Benoit, Hallgrimsdottir, & Vallance, 2012). There is evidence that, once tainted, individuals will maintain the stigma even after they leave the volunteer role (see Bergman & Chalkley, 2007), and public health theorists have begun worrying that the stigmatization of volunteer helpers may arise with other infectious diseases that do not contain the risky-behavior subtext associated with AIDS—SARS, for example (Des Jarlais, Galea, Tracy, Tross, & Vlahov, 2006).

As volunteering is a form of cooperation⁸ within a social dilemma—charity is a type of public good, because anyone can take advantage of it, regardless of whether they have contributed to the charity—negative inferences about a volunteer's motivations and qualities is functionally a type of antagonism. If the volunteer is sufficiently bothered by the negative inferences that he or she gives up volunteering, we have yet another situation in which cooperation has diminished as a result of poor treatment of the cooperator. Why volunteers are sometimes treated this way is not known, but related research on stigma by association indicates that when the relationship between the stigmatized person and the companion is socially superficial, negative perceptions of the companion are most likely to be made by those who hold implicit associations between the stigmatized condition and negative qualities (Pryor, Reeder, & Monroe, 2012). Thus, a person who associates AIDS with sexual promiscuity or intravenous drug use would be more likely to be hostile toward

AIDS volunteers than would be the person who associates AIDS with more neutral qualities. Factors similar to those documented by Parks and Stone (2010) may also come into play, with people feeling that the volunteer is raising the standard of expected behavior within the group or seeing the volunteer as engaging in socially incorrect behavior: Only homosexuals should work with AIDS sufferers, only recovering addicts should work with drug abusers, and so on, and those who do not follow such a rule are behaving inappropriately. A host of research is needed into why those who offer their help to needy others are sometimes treated badly, but for now it is important to understand that such behavior can undermine the development of a form of large-scale cooperation.

Summary of the work on antagonism and cooperation

What we have seen is that cooperation can be discouraged by both situational and interpersonal factors. Further, the interpersonal factors can sometimes come from within the cooperative actor's own group. An anti-commons-type situation introduces unusual power dynamics, in that many, or all, group members have the ability alone to thwart attempts at cooperation. If the person realizes that she or he does have this ability, it can lead to what we suggest is a perception of being pivotal, which in turn may stimulate feelings of greed, a desire to demonstrate one's superiority over others, and a corresponding lack of awareness of how others are being impacted by one's noncooperative behavior. In public goods dilemmas, similar problems can arise if the person sees his or her contribution as critical, in that whether the person contributes will determine, or largely determine, whether the good is provided.

If the task involves collaboration between different subgroups, additional issues can arise with in-group/out-group distinctions. People may not want out-group members to benefit from the collective success and may act to discourage the collaboration necessary to be successful. That their in-group will also suffer is really not of concern. We have also seen that people will sometimes try to reduce cooperation by members of their own in-group, possibly to the point where the cooperator just ceases to be giving at all and maybe leaves the group. What motivates this type of behavior is unclear, but it may be connected to factors such as self-perception concerns, definition of generous people as deviant, or association of bad qualities with the cooperative actions. For both the power and out-group issues, we presented a number of real examples to demonstrate that these are not merely problems in theory—they occur with regularity.

It is clear, then, that people can be very cooperative, and they can be destructive of attempts at cooperation. All of this poses a challenge for those who want to encourage more widespread and deeper cooperation in society, especially because there seems to be little consistency in when people will work for the collective good and when they will try to harm it. What can be done to help decision makers who are trying to produce things that will benefit the greatest number of people?

Solving Public Goods Problems

Quite often, individuals within dyads and groups are able to obtain collectively desirable outcomes by establishing stable patterns of mutual cooperation. Of course, in such cases, individuals use the mixed-motive situation in a manner beneficial to all members involved, and the “dilemma” has been fruitfully solved. Alternatively, it is easy to imagine that a group or dyad fails to establish a cooperative, mutually beneficial pattern of interaction. In fact, as we have seen, it may just take one member who continues to behave in a selfish manner for two people to develop a noncooperative relationship. And one “bad apple” can seriously undermine cooperation in groups. Or as we have seen in the anticommens dilemma, one person may use coercive power in ways that blocks the interests of the other people—and, perhaps equally important, that frustrate them in an efficient goal pursuit—which may elicit thoughts and emotions that tend to be destructive, rather than constructive, for pursuing collective interests. The result may be noncooperative interaction, perhaps along with pronounced feelings of antagonism and enduring conflict. The key question is, of course, what can one do to resolve patterns of noncooperation, antagonism, and conflict?

Many researchers have taken up this question, and through this work three classes of solutions have emerged. A first class of solution may be referred to as *structural solutions*, which center on changing the interdependence structure of the social dilemmas. A second class involves *third-party intervention*, whereby a third party is involved in regulating constructive problem-solving. Finally, a third class may be referred to as *psychological solutions*, which are aimed at changing the thoughts and feelings of people involved, along with their patterns of communication.

Structural solutions

When individuals are unable to obtain collectively desirable outcomes in a given situation, they may consider structural solutions by altering the structure of the situation in such a manner as to stimulate cooperative behavior (Messick & Brewer, 1983). There are at least two distinct forms of structural solutions: change in the

outcome structure underlying a mixed-motive situation and change in the *decision structure* underlying a mixed-motive situation.

Outcome structure. Changes in *outcome structure* can focus on either rewarding cooperation or punishing noncooperation. A concrete example of the former is implementation of a carpool lane. In an attempt to promote carpooling and discourage individual car use, the Dutch government decided to reward carpooling by implementing a carpool priority lane, a lane on a highway near Amsterdam that could be used only by carpoolers. It was less congested, and so traffic moved more quickly than in other lanes. Unfortunately, the lane was largely ineffective and underused, in part because solo drivers felt they were unable to change to carpooling (Van Vugt, Van Lange, Meertens, & Joireman, 1996). Another solution involves punishing noncooperation to make it less attractive. For example, governments might implement a system by which car drivers have to pay for using the highway during rush hour (cf. Yamagishi, 1986, 1988). Clearly, reward and punishment are frequently used to promote collectively desirable behavior, not just by governments (such as through taxes and subsidies) but also by employers, colleagues, relationship partners, and so on.

Yamagishi (1986, 1988) advanced an important distinction between elementary cooperation, or the willingness to cooperate at a cost to self, and instrumental cooperation, or the willingness to contribute to a sanctioning (or reward) system that punishes noncooperators (or rewards cooperators). Although we have focused on elementary cooperation, in everyday interaction people often pay or contribute to systems that sanction noncooperators (e.g., contributing to the collective expense for conductors who will stop free riders of public transportation). Fehr and Gächter (2000, 2002) developed a public good paradigm that demonstrated that the use of costly peer punishment could effectively increase contributions to public goods. In this paradigm, participants interact in a small group and have an opportunity to contribute to a public good or free ride on the contributions of their group members. After making their decision, each group member learns about the decision of the other group members, and at that point they decide to pay a cost to reduce the earnings of any specific group member(s), so punishing those member(s). Fehr and Gächter found that over time people tended to make greater contributions to the public good with the presence of punishment opportunities, compared with when punishment opportunities were absent. Subsequent research replicated and supported the conclusion that individuals are willing to pay a cost to punish free riders and that this can effectively and efficiently increase contributions to public goods (Gächter, Renner, & Sefton, 2008; Gülerk,

Irlenbusch, & Rockenbach, 2006; Rockenbach & Milinski, 2006).

Rewards and punishments are incentives that tend to capture strong views of human nature as well as beliefs regarding public policy, political structures, and organizational systems. Some believe that incentives are effective tools that help regulate individuals in their pursuit of self-interest. Others believe that incentives may undermine autonomy and authenticity and, most important, the true motive to be good. One of the strongest views was expressed by Thomas Hobbes (1651/1985), who argued that people who want collective interest to triumph over self-interest should support Leviathan, an authority or government that enforces social order. Hardin (1968) noted that coercion may be the most effective tool to encourage people to sacrifice self-interest for collective benefit. These ideas ignited interdisciplinary research across the biological and social sciences on the effect of incentives as a solution to cooperation (Edney & Harper, 1978; Fehr & Gächter, 2000; Lynn & Oldenquist, 1986; Ostrom, Walker, & Gardner, 1992; Yamagishi, 1986). This research has generally supported the position of Hobbes and Hardin: Incentives for cooperation do encourage people to sacrifice their self-interest for collective benefit.

However, other perspectives suggest that incentives may undermine cooperation. For example, there is some evidence that incentives may undermine autonomy and the intrinsic motivation to cooperate (Deci & Ryan, 2012), which can reduce persistence in cooperation (Lepper & Greene, 1978), result in resistance to comply with the external forces (Brehm, 1966), and/or influence a decline in cooperation if the incentive is no longer present (Deci, Koestner, & Ryan, 1999). Social incentives can also evoke costly retaliation (Denant-Boemont, Masclet, & Noussair, 2007; Hopfensitz & Rueben, 2009), transform an ethical decision into a business decision (Gneezy & Rustichini, 2000; Tenbrunsel & Messick, 1999), and even undermine trust in others (Chen, Pillutla, & Yao, 2009; Mulder, van Dijk, De Cremer, & Wilke, 2006). Although these disadvantages of incentives may not be a threat to their effectiveness as long as they are strong and inescapable (Tenbrunsel & Messick, 1999), it is often unfeasible and/or undesirable to install strong incentives for cooperation and a watertight monitoring system. Whereas incentives can exert negative psychological effects (e.g., reactance, a lack of intrinsic obligation, and distrust), one cannot expect an incentive system to be an all-encompassing and long-term solution to social dilemmas. Instead, we should understand under what conditions incentives are most effective. A recent meta-analysis (Balliet et al., 2011) involving nearly 200 effect sizes showed strong support for the view that both reward and punishment are effective at promoting cooperation and that rewards and punishment have about equally strong effects on cooperation.

This is important because prior research, using somewhat different research paradigms, has revealed that rewards are more effective than punishment, as well as that punishment is more effective than reward, or that there is no difference between the two incentives in terms of effectiveness (see Balliet et al., 2011). Thus, the bigger picture seems to be, at least in the context of public goods, that cooperation could be promoted about equally strongly by rewards and punishment.

Changes in the outcome structure generally are quite effective in promoting cooperation, for two broad reasons. First, such solutions change the outcome structure in such a manner that the mixed-motive nature of the situation is diminished (i.e., when cooperation becomes almost as attractive to individuals as noncooperation), or they remove altogether the mixed-motive nature (i.e., when cooperation becomes more attractive to individuals than noncooperation). Second, outcome changes tend to enhance people's expectations regarding other's willingness to cooperate, thereby removing one important barrier for cooperation (Yamagishi, 1986). At the same time, there are often several barriers to overcome to be able to implement outcome change. They are more likely to be accepted if they are perceived as efficient (i.e., effective in promoting collective well-being) and fair (i.e., the costs for realizing such collectively desirable outcomes are distributed fairly among the participants in the group or community; C. D. Samuelson, 1991). Further, all or most individuals must feel that they are able to make a cooperative choice, which certainly is not always the case in real-life social dilemmas (see Van Vugt et al., 1996). For example, for some people it might be quite a challenge to find a carpool partner or coordinate time schedules at work. For such people, carpooling, even if they are aware that it is an environmentally friendly commuting option, may not seem feasible. It appears just too complicated to pull together. For people like this, incentives do tend to be effective at promoting cooperation.

As the meta-analysis by Balliet et al. (2011) indicates, structural solutions, such as rewards and punishment, might be more effective to the extent that participants believe that these incentives are administered with genuine intentions to safeguard and promote collective interests. This is an important issue. Frequently, situations involving conflicting interests may lead to *emergent leadership*, in that one of the participants takes the initiative to reward cooperation and punish noncooperation, or *assigned leadership*, in that an external leader is assigned to provide such incentives. Also, sometimes it does not take leadership per se but that people within a group informally reward or punish each other by conveying approval or disapproval, by supporting solutions by which the free riders are punished or the contributors rewarded. In these situations, it is essential that the

administration of incentives is to be trusted. One way in which the leader (or fellow participants) can communicate trust (or genuine intentions to safeguard and promote collective interests) is to demonstrate unequivocally that the rewards and punishment were not “cheap”—that they entailed costs to the administrator.

This observation in a broad sense suggests the importance of a somewhat self-sacrificial leadership, which captures key elements of “transformational leadership” or “servant leadership,” concepts that have become quite influential in the management and organizational psychology literatures (e.g., Bass & Riggio, 2006; Burns, 1978). This might be a challenge to quite a few leaders, because they have a tendency to think that they are entitled to receive more than a fair share (De Cremer, van Dijk, & Reinders Folmer, 2009). But it might also be important, if not more important, for leaders to always make sure that they do not provide a “bad example” for others. Every now and then, we may witness politicians, bankers, or other people in similar positions of power engage in actions that clearly serve their self-interest at the expense of other people. A case in point is, of course, the bankers who reward one another’s short-term profit with excessive bonuses, while the collective (the employees, the state, or nation, including the taxpayer) pay the costs of such bonuses. Even more minor norm violations, such as a leader who declares private expenses (e.g., the costs of a few extra days of vacation on a business trip), may undermine trust in leadership and authority and hence undercut cooperation in profound ways. There is a tendency for people to have less trust in leaders than in their fellow participants, and so sometimes it is useful to decentralize the administration of rewards and punishment.

Decision structure. So far we have focused on structural solutions that influence the outcomes, yet structural solutions can also entail changes in the *decision structure* underlying a mixed-motive situation. For example, negotiators may opt for a judge who will eventually resolve their conflict. In group contexts, individuals may elect a leader from their group who would make decisions for the entire group. As is often the case with other structural solutions, individuals are more strongly motivated to elect a leader when they repeatedly fail to obtain stable patterns of mutual cooperation (e.g., De Cremer & Van Vugt, 2002). Indeed, the major task of governments, managers, and leaders in organizations and private business is to manage mixed-motive situations in a manner beneficial to the well-being of the collective (i.e., the organization). This is in essence what Hobbes (1651/1985) argued several centuries ago. Yet a strong central authority is unable to regulate all forms of interpersonal and intergroup behavior. And humans have probably evolved to approach mixed-motive situations in such a manner that

they themselves are quite able to pursue and accomplish relatively stable patterns of mutual cooperation. That humans are not always able to reach such solutions themselves is self-evident, particularly for large-scale social dilemmas, such as maintaining a healthy environment, providing a well-functioning tax-paying system, or engaging in collective efforts and sacrifices that seem to be needed to cope with the economic crisis. And these are exactly the domains where structural solutions are most urgent.

Third-party solutions

Third-party intervention can take the form of emergent intervention or contractual intervention. Emergent intervention usually has no formally defined role, and the third party usually has an ongoing relationship with one or both parties to the conflict. Examples are third-party interventions by parents, neighbors, friends, fellow group members, or colleagues. In the case of emergent intervention, third parties volunteer to offer services that the dyad or group can either accept or reject. Alternatively, in the case of contractual third-party intervention, members of the dyad or group invite a third party to offer services to solve the conflict. Examples are third-party interventions by a police officer, a judge, a personnel officer, or some external agency specialized in conflict resolution (e.g., the United Nations).

Third parties take on a variety of roles and strategies. Building on the pioneering work by Thibaut and Walker (1975), Sheppard (1984) distinguished between *process control*, a third party’s control over the presentation and interpretation of evidence relevant to the dispute, and *decision control*, a third party’s control over the outcome of the dispute. These two dimensions jointly produce four distinct roles a third party adopts when intervening in a conflict between two or more people: (a) an impetus role, (b) an inquisitorial role, (c) an adjudicative role, and (d) a mediational role. When third parties lack process and decision control they assume an *impetus role*, providing advice and suggestions. Examples of such third parties are personnel advisors or job counselors in organizations, but such third parties could also be friends or colleagues. These people often provide relevant information or suggest how to approach the conflict, without actually controlling the process or the outcome. When, in contrast, third parties exercise both process and decision control, they assume an *inquisitorial role*. An example is a manager who intervenes in a conflict between two subordinates fighting over office space. In such a situation, the manager both controls the process (when do we talk about it, who talks first) and the outcome (who gets the nice desk at the window). When third parties exert only decision control, they assume an *adjudicative role*. A

good example is the judge, who listens to each party, or his or her representative, and then makes a decision. In the example of the two colleagues disputing a desk near the window, their manager may adopt (and often does) an adjudicative role—listening to each side and then making a decision. Finally, third parties adopt a *mediational role* when they exercise process control only. An example of mediation is a colleague assisting two disputants fighting over office space. This colleague is “involved” and controls the process but is unable to enforce a solution and decide who will get the desk near the window.

Of the four roles third parties may assume, the role of the mediator is most popular (e.g., Carnevale & Pruitt, 1992; Gelfand, Fulmer, & Severance, 2010; Lewicki & Sheppard, 1985). Why might that be? One reason is that, contrary to the inquisitorial and adjudicative roles, mediators leave decision control to the disputants. This feeling of control over the final outcome is understandably important to conflict parties. Another reason is that mediation more often than any other role produces stable agreements that are acceptable to both parties. As such, mediation may improve the relationship between the parties and may help them to (re)establish a mutually beneficial future. Mediation could be used to enhance cooperation in social dilemmas and negotiation situations. What is essential is that the parties involved lack some information to reach mutual cooperation or have developed a climate of distrust and noncooperation and perhaps escalation of conflict. In those situations, mediation can serve various functions. Sometimes, the mere presence of a third party generates tendencies toward agreement and finding constructive solutions (e.g., Manzini & Mariotti, 2001). More specific benefits of mediation may be that it facilitates communication, helps reinforce norms for constructive problem solving, and provides opportunities for respectful retreat or minimizing loss of face (Carnevale & Pruitt, 1992; Gelfand et al., 2010).

As we have seen with administrators of incentives, for mediation to be effective, it is important that the mediator is trusted. More concretely, mediation is most likely to be effective when mediators (a) exhibit a concern for aspirations of both parties and (b) perceive common ground. In such situations, mediators are most likely to choose an integrating, problem-solving strategy. In this case, mediators may ask questions to understand the underlying desires and interest each of the conflict parties brings to the table and propose solutions that satisfy the needs and desires of all parties involved. A classic example is the mediation by former U.S. president Jimmy Carter in the conflict between Egypt and Israel concerning the Sinai. Israel occupied large parts of the Sinai and refused to return it to Egypt, which had sound historical claims. As a mediator, Jimmy Carter discovered that Israel held onto

the Sinai because it desired safety and protection, whereas Egypt held onto the Sinai because of territorial desires. The integrative solution Jimmy Carter proposed was for Israel to return the Sinai to Egypt, with Egypt allowing for a large demilitarized zone—this way, both disputants had their basic desires fulfilled.

As alluded to earlier, mediator bias is likely to be revealed in placing stronger emphasis on one party's aspirations (and, often, a relative neglect of common ground), either before the mediation starts or during the process of conflict resolution (Van de Vliert, 1992). Mediator bias may be merely perceptual (i.e., in the heads of the parties), but sometimes it may be real. For example, mediators may in fact side with more powerful parties, especially when this powerful party also has substantial capacity to sanction the mediator. Although mediator bias is often a threat to constructive conflict resolution, several authors argue that a biased mediator is sometimes the only one available to mediate the conflict. Also, disputants are more willing to accept a biased mediator if he or she is believed to exhibit this bias before the mediation starts and not during conflict resolution (e.g., Pruitt & Carnevale, 1993). But if such bias before the mediation can be avoided, all the better. All the pieces that enhance trust, including characteristics such as liability, integrity, and competence, as well as authoritative-ness and impartiality, increase the chances of mediation success (see Gelfand et al., 2010). Research has revealed that mediation through electronic devices (e-mediation) can also yield positive results. For example, an e-mediation program in which an electronic program served as mediator between the parties by providing suggestions and advice based on formalized rules and algorithms yielded high levels of agreements in negotiations compared with a paper version of advice (Druckman, Druckman, & Arai, 2004). Thus, it may be possible to use relatively cost-effective tools to promote constructive problem solving.

Psychological solutions

Structural solutions focus on changing the interdependence structure, and third-party intervention focuses on the help of a third party (often through mediation). Both solutions involve some actual change in the situation. In contrast, psychological solutions are focused not so much on actual changes in the situation but rather on changes in the behavior, thoughts, and emotions within a person or between persons through change in communication. Of course, structural solutions and third-party solutions bring about psychological change, but in this section we focus on measures that center on the mere psychology within a person or between persons for bringing about behavioral change.

Promoting trust. One way or another, nearly all theories of conflict and cooperation emphasize the importance of trust. The key question is, of course, how can one promote and sustain trust? There are indeed several factors that might form a threat to trust. One is that a person has at one point in time too little self-control to resist the temptation to make a noncooperative choice, perhaps even when he or she implicitly believes that the other will make a cooperative choice. If so, it is the temptation of greed that undermined trust. A related one is that a person makes a noncooperative choice, because he or she is not sure that the other will make a cooperative choice. If so, it is the fear of the other's noncooperative choice that undermined trust. In addition to fear and greed, there may be unintended error, in that a person accidentally produced a more negative outcome for the other than intended (i.e., negative noise; Kollock, 1993; Van Lange et al., 2002). Indeed, in many real-world situations, errors do occur. We may arrive too late for appointments because of traffic that could not be foreseen, we may accidentally say the wrong thing at the wrong time, or we may not reply to an urgent e-mail because of some technical problems.

These are three examples of behavior—an incident of greed, fear, or negative noise—that are easy to imagine happening. Yet they might undermine trust in a serious manner and perhaps even for quite some time. After all, one noncooperative action in a cycle of cooperation interaction is likely to have far more impact than one cooperative action. These issues are important to individuals, but they may be even more important to groups or group leaders (Reinders Folmer, Klapwijk, De Cremer, & Van Lange, 2012), to people who we might not immediately trust, or to contexts where trust is not directly the default. How can one restore trust? How can one communicate trust?

One important way is to communicate generosity. It has been demonstrated that behaving a little more cooperatively than one's interaction partner is quite an effective way to build trust (Klapwijk & Van Lange, 2009; Van Lange et al., 2002). For example, even under circumstances of negative noise—when mistakes can and do happen—we see that other people do maintain impressions of benign intent about interaction partners who behave in a generous manner. It is also interesting that generosity elicits high levels of cooperation in social dilemmas with and without noise. Yet partners who behave in a tit-for-tat manner (reciprocity but no generosity) do suffer from noise: They elicit high levels of cooperation in noise-free social dilemmas but not in social dilemmas with noise. Of course, generosity has its limits. For example, sometimes generous people are considered to be unusual and might be derogated a little bit and even be excluded from the group (e.g., Parks &

Stone, 2010). But at least in the context of dyads, consistently behaving in a generous manner allows one to maintain trust, even if every now and then the flow of cooperative interaction is challenged by incidents of negative noise.

Another important way to maintain or perhaps restore trust is to enter the cycle of apology and forgiveness. During the 1990s, an impressive number of studies examined the causes and consequences of forgiveness (e.g., McCullough, Worthington, & Rachal, 1997). This line of research has revealed, among other things, that apology is perhaps one of the most powerful determinants of forgiveness (McCullough et al., 1998). Apology is a powerful means by which a person who has engaged in noncooperative action can promote forgiveness and thereby trust. There is indeed evidence that forgiveness promotes a number of prosocial tendencies, including thinking in terms of we (rather than me), trust, and behaving in a cooperative manner (Karremans & Van Lange, 2004) and is negatively related to aggression toward the offender (Fincham & Beach, 2002). Although forgiveness has often been studied in terms of its link to psychological health, we also suggest that it is a powerful way to resolve conflict and build trust—and we suggest that the apology is one of the most effective ways to promote trust, at least for relatively minor offenses or norm violations.

The functions of generosity, apology, and forgiveness have clear benefits in ongoing interactions in dyads and perhaps small groups. There is now increasing research on examining such issues in the contexts of larger groups and especially in terms of improving intergroup relations. The general conclusion seems to be that at least forgiveness and apology might also be quite beneficial to intergroup relations. We are not aware of programs of research on generosity between groups or group representatives, and so this topic awaits future research. And thinking about larger groups and intergroup relations, we suggest that a route in which people appeal to identity needs, or the need to belong, may be at least equally fruitful. And as we will see, appeals to identity seem quite strongly related to trust—whereas forgiveness and especially generosity constitute trust-building routes in interpersonal and small group interaction, identity can promote trust and cooperation in larger groups and perhaps in interaction between groups.

Promoting identity. As described earlier, there is considerable evidence that people are more cooperative toward members of their own group than to members of another group. Also, if feelings of their own group are enhanced, people are more likely to trust their in-group members and therefore act in a more cooperative manner (Foddy, Platow, & Yamagishi, 2009). A classic study by Brewer and Kramer (1986) revealed that feelings of

group identity may be crucial when group members face the most urgent situation in a resource dilemma—when the resource is close to being overused and depleted. Identity and trust are closely intertwined, but there are several ways in which identity can be promoted—with the positive effects on trust and cooperation, even in larger groups. Clearly, groups with whom we share strong feelings of attachments are probably the ones with whom we identify most and whom we trust the most.

Members of a family or a close group of friends provide a strong sense of identity. But people also identify with larger communities, such as the members of their neighborhood, colleagues at work, or members of the local sports club. It is no coincidence that even in such networks, we face a strong sense of identity and trust. As a case in point, fishermen who were more strongly connected to one another in communities were better able to optimally catch fish—and not deplete the fish—than fishermen in more loosely connected communities (Penn, 2003). In larger groups, it is often categorical information that provides a sense of identity: One can categorize oneself into one of the many subgroups that typically exist within a big group (e.g., gender, profession, fandom of a sports team). Category definitions are often not rigid; for example, an experimental social psychologist might categorize him- or herself as a scientist, a social scientist, a psychologist, or a social psychologist. As noted by Gaertner and Dovidio (2012), it is often possible to make salient a common membership to enhance intergroup relationships—reducing stereotyping, promoting trust, and so on. Even an appeal to the largest category of all, global citizenship, has the potential to promote cooperation (Buchan et al., 2009).

Appealing to identity can be an important way to influence trust, at least temporarily. That people have something in common is often a way to trigger some feelings of connectedness, which may form the basis for some (generalized) trust. Group categories are also useful for promoting cooperation in so-called multilayered social dilemmas (Wit & Kerr, 2002; see also team games, Bornstein, 1992), in which the dilemma can occur at different social “layers”: the individual, the in-group or out-group, and the entire collective. What do these entities mean for the social orientations that may (or may not) be activated? The soldier deciding whether to fight for “his country” is faced with this layered social dilemma, as are many employees who sometimes must decide among pursuing their self-interest, the interests of the unit or team in which they are working, and the interests of the entire organization. For example, to ask for greater resources than one actually needs (e.g., very advanced computers) may at times help management appreciate the performance of one’s own unit a bit more, but an organization is obviously not served by units that are

always asking for greater resources than they actually need. Thus, layered social dilemmas may bring about “problems” in that a “prosocial orientation” may well translate into cooperation with in-group members, which may exert detrimental effects for the larger collective. In fact, there is some preliminary evidence suggesting that in-group cooperation (which, as we saw earlier, is sometimes referred to as parochial altruism) accounts for most of the cooperation one can witness in natural life (cf. Henrich et al., 2006).

However, layered social dilemmas also bring about “opportunities” for promoting collectively desired behaviors. Sometimes, it is even possible to make salient a layer to the social dilemma that would otherwise remain subtle or even unnoticed. For example, the installation of an award for a group category makes that subgroup salient (e.g., the clean city award), which may eventually help the entire country. A large organization can award working units for hiring categories of people that are underrepresented, such as ethnic minorities. Thus, it is of great importance for policy makers to analyze the situation carefully in terms of differing layers and the ways in which the interests correspond versus conflict for each pair of the layer (individual vs. in-group, individual vs. collective, and in-group vs. collective). Creative and powerful solutions to social dilemmas may be generated if one is able to induce or make salient a new layer in the social dilemma that in many ways serves as a psychological tool for promoting desirable outcomes for the entire collective.

Promoting longer term perspectives. When people are involved in conflict or are upset about something, it is quite natural to become “focused” on the concrete and the here and now. After all, any type of emergency calls for concrete, immediate action. It is interesting that collective interests (and, of course, longer term self-interest) often extends over time. For example, one can be angry about what a member of a group said, did, or did not do, and it would be important to consider concrete action. Yet it is still important to think in terms of the long-term implications of one’s actions. Indeed, one simple-yet-thoughtful piece of advice is to take the long-term perspective. It is simple, as well as thoughtful, because for an actor it is often the longer term interests—either for the collective or for the actor—that are readily overlooked.

We suggest that differences in short-term or long-term orientations are often shaped by specific circumstances in combination with one’s own personal qualities (such as age, market value, and the like). For example, in many countries, it is widely believed for many professions that it is exceptionally difficult to find a new job if one is older than 50 years (see, e.g., Singer & Sewell, 2006).

Such beliefs, true or not, shape people's orientation to the organization for which they are currently working and increase their commitment to the organization, if for no other reason than that they fear not being able to find another job. In light of such beliefs, the employee is likely to strengthen a long-term orientation to the organization. Younger people, who are believed to have greater "market value," are, quite understandably, less likely to adopt a long-term orientation (G. H. L. Cheng & Chan, 2007). From a management point of view, in the presence of such beliefs, it may be important to include senior employees in decision-making regarding the future of the organization—not only to benefit from their experience but also because they may simply care more about the future of the organization. As another example, in communities we may often witness differences in short-term and future orientation, because some may regard their house as temporary (e.g., for those having a job that requires occasional moving, for students who live in the community), whereas others feel that their house is theirs "forever." The latter group is, therefore, more likely to invest in the future of the neighborhood, which may be manifested in greater participation in various types of community service (Van Lange & Joireman, 2008).

A complicating factor in the promotion of long-term thinking about some public goods is an intergenerational aspect of the good: Whether the good is provided now or not will impact future generations, and in fact, the current actors may not actually experience the benefits of their cooperation. Consider, for example, a driver who converts to an electric car now so that the world's oil supplies will last into the next century. That the person's conversion will help make sure there is still gasoline in 2100 does not benefit that person at all. Research suggests that it is hard to persuade people to care about a problem that is more than a couple of generations removed, primarily because they tend to see the hoped-for outcome as increasingly less certain as it is delayed into the future (Wade-Benzoni, 2008; Wade-Benzoni & Tost, 2009) and partially because they discount the value that future generations will place on the outcomes they helped bring about (Wade-Benzoni, 2008). However, willingness to act now for future generations increases if people see their actions as an opportunity to leave a legacy and be remembered after they have died (Wade-Benzoni & Tost, 2009; Wade-Benzoni, Tost, Hernandez, & Larrick, 2012) and if people feel an affinity with future generations (Wade-Benzoni, 2008).

It is interesting that differences in "market value" also tend to underlie one's commitment to an ongoing relationship. For example, a partner who judges his or her alternatives as better (evaluation of being single or degree to which attractive alternative partners are judged to be "attainable") is somewhat less likely to take a long-term

perspective to the relationship. A consequence may be that such partners are less willing to sacrifice for the partner or even to respond constructively to relatively small hassles in a relationship (for a review, see Rusbult & Van Lange, 2003). The other side of the coin is that partners who judge their alternatives as not very good at all may feel trapped in a relationship—and so believe that they have no choice but to remain in the relationship, even if the partner behaves in an exploitative or even abusive manner. This is the principle that is thought to explain why battered women remain in the abusive relationship—such women often have no independent income and have children to care for, and so they see no options (e.g., Rusbult & Martz, 1995). A similar phenomenon might also occur within public goods groups: The group might be failing to consistently provide the good, but if members see no alternatives, they may elect to keep things as is, even if a change of the types we have been discussing would improve matters.

Concluding remarks

Though we have distinguished between structural solutions, third-party intervention, and psychological solutions, it is often the combination of measures, rather than their isolated effects, that effectively promote cooperation and reduce antagonism and destructive conflict. For example, authorities are often associated with structural solutions, such as sanctioning free riding and rewarding cooperative action, and trust is often associated with interpersonal relations. But like trust among people, trust between people and institutes (institutional trust) is crucial for the acceptance of rewards and punishment. Above and beyond outcomes in a narrow sense, people want to be treated fairly and respectfully. For example, a (local) government that listens to the concerns of its citizens and provides accurate information in a transparent manner might often enhance not only institutional trust but also a stronger commitment and willingness among people to make a positive contribution to urgent social dilemmas. A case in point is Tyler and Degoe's (1995) research on the 1991 water shortage in California, which demonstrated that people exercised more constraint on their water consumption if they felt treated more fairly by the authorities.

Likewise, it is often true that relatively small groups in large societies, such as local communities, have enormous potential to organize and manage themselves in ways that promote cooperation and prevent them from depleting natural resources. In small groups, people are able to develop rules that match the local circumstances, and they are able to monitor one another's behavior, to punish free-riding, and to reward generosity quite effectively. Needless to say, people care very strongly about

their image or reputation in their local community, and so if the norms favoring cooperation are well specified, then often the mere presence of others makes a big difference. These are important virtues of a local organization, formal or informal, relative to a more global authority.

It is crucial that such members of small communities trust each other so that monitoring and norm enforcement can take place in a cost-effective, informal manner. A recent meta-analysis of 18 societies provides evidence that trust and social norm enforcement may reinforce each other in securing and promoting cooperation in large-scale societies (Balliet & Van Lange, in press-a, in press-b). In societies where trust is low (such as Greece or South Africa), punishment is largely ineffective at promoting cooperation, but in high-trust societies (such as Denmark), possibilities for punishment in public goods dilemmas promoted cooperation very effectively. The broad conclusion is that the effectiveness of punishment in promoting cooperation in a public goods situation is greater in societies with high rather than low trust. Another important finding of this meta-analysis was that societies with stronger democracies demonstrate a greater ability to secure and promote contributions toward public goods by the use of peer punishment. These findings suggest that the ways in which individuals relate to each other in small groups and local communities are important to the overall functioning of society and that structural solutions, third-party intervention, and psychological solutions all have great potential for improving rate of contribution toward the good. Or as Ostrom and Ahn (2008) stated: “the very condition for a successful market economy and democracy is that a vast number of people relate in a trustworthy manner when dealing with others to achieve collective actions of various scales” (p. 24).

Policy Recommendations

We have covered a considerable amount of ground in the preceding review. We have looked at the factors that encourage cooperation, the factors that can lead to antagonism and hence lack of cooperation, and some different approaches to the resolution of public goods problems. All of this can be integrated into some practical recommendations that are cost-efficient and relatively easily implemented. It is, however, important to recognize that there is no magic bullet that will encourage all people to support all attempts to supply publicly beneficial goods. There will always be someone, or some group, that does not value the good more than the status quo. At best, such people will stand on the sidelines as everyone else tries to provide the good; at worst, they will be obstructionist. Our recommendations in this section are designed to help win over people who are

potentially favorable toward the good. Changing the minds of the opposed is a different matter entirely.

We are certainly not the first group of social dilemma researchers to take up the question of how cooperation research can assist policy development. For example, earlier we mentioned Ostrom’s (1990) demonstrations of the benefits of local management of the commons. Her work has considerable value for policy making, a fact that she herself recognized, and in fact she shared the 2009 Nobel Prize in economics in part because her research is so informative for policy. Similarly, Hardin’s (1968) ideas on the tragedy of the commons are regularly appealed to when policy makers consider issues of commons management. These are perhaps the most prominent examples of research on cooperation contributing to policy, but there are numerous others: Adams, Brockington, Dyson, and Vira (2003), Feeny, Berkes, McCay, and Acheson (1990), Kahneman and Knetsch (1992), and Biel and Thøgersen (2007) are just a few examples of research groups that have discussed how aspects of cooperation research might inform the practice of providing and managing collective goods. However, these teams have tended to focus on more macrolevel aspects of the process of good provision—for example, Ostrom famously showed that local groups can manage a commons quite well without the involvement of external forces, and Kahneman and Knetsch (1992) found that it is difficult to isolate the pure economic value of a good from the moral value of its provision. Throughout this review, we have been focusing on the interpersonal dimension of cooperation and noncooperation. Our focus in this section is thus on how interpersonal dynamics can also play a role in effective policy development.

Environmental problems

Perhaps the most pressing policy domain in which the current ideas apply is the area of environmental problems, especially the problem of global warming. One of the problems with motivating action to reduce global warming is that for so many years the problem seemed abstract and unlikely to affect us in our lifetimes. Not so anymore, as scientists are recognizing that climate change is occurring even faster than recent projections had anticipated. In light of this problem, policy makers must figure out how to motivate citizens to take action against climate change. Many of the problem-solving approaches that we have discussed can be brought to bear here. First, we can consider the ways in which people likely think about global warming. Future problems tend to be construed in a more abstract fashion (N. Liberman, Trope, McCrea, & Sherman, 2007), making it difficult to comprehend the real consequences of the problem. Although we

can imagine abstractly what it would be like if Florida were submerged, the conception is going to be no more specific than that the United States would lose some land and the map would change. The economic and population disruption cannot really be imagined, and even if it is thought about, a person will likely conclude that Floridians could just move northward, and the world would just lose access to a vacation hotspot. Thus, policy makers should focus on the more immediate and concrete consequences associated with global warming, such as quickly receding glaciers, increased flooding, and increases in storm severity. As an example of this, it has been shown that Americans who live in parts of the country that have been experiencing extreme weather are more likely to accept that global warming is occurring than are people who have been experiencing relatively mild weather (Egan & Mullin, 2012). The experiences of the former are more concrete than are the experiences of the latter.

Next, policy makers need to take up the intergenerational aspect of global warming. Although there are many immediate consequences of the problem, there is also a host of consequences that will occur only over a number of lifetimes. It is unclear, for example, at what point rising sea levels will begin to cause real disruption to coastal cities (Nicholls & Cazenave, 2010), but climate experts are largely focused on trying to predict where sea levels will be in 2100 (e.g., Meehl et al., 2005), a date when none of us will be alive, our children will likely not be alive, and our grandchildren will be old. It is an issue our great-grandchildren may have to wrestle with. Coastal flooding in 2100, then, will probably not affect anyone we will ever know well. As we have seen, the dynamics of intergenerational dilemmas are such that the problems of our great-grandchildren are likely not going to trouble us very much—we have no idea whether what we are trying to accomplish will actually happen, and if it does, we doubt that those future citizens are going to see the outcome we have given them as very useful. We can combat this, however, by emphasizing the “legacy” aspect of a person’s choices and building a sense of affinity or oneness with future generations. How can this be done?

Insights from the organizational psychology literature are fruitful here. Tost and colleagues (Tost, Hernandez, & Wade-Benzoni, 2008) pointed out that the relationship between the current generation and a distant future generation is completely power asymmetric: Everything that we do can affect them, but nothing they can do will affect us. It has been shown that in public good-type situations, people typically act so as to make sure others get some benefit if others are completely powerless, because the situation induces a mindset that it is wrong to take advantage of a helpless other (van Dijk & Vermunt, 2000). Policy makers might thus make clear this asymmetry and

emphasize the helpless nature of future generations. Some might argue that such messages are already being used, but the current approach does not follow our recommendation, instead emphasizing that if we do not act now, future generations will have to take extreme measures to fix things. The 2009 Copenhagen Protocol, for example, noted that failure to effectively act now will create “further problems for later generations.” Such an approach conveys that they are not helpless but rather are going to be inconvenienced by our failures to act, which obscures the power-asymmetric nature of the situation. It is a simple matter to premise policy on the notion that future others are at our mercy.

Policy can also be grounded in the notion that we are one with those who will be alive 90 years from now. Again, this has already been attempted, with appeals to concerns about our great-grandchildren’s future, but the need is to go one step further and develop a felt connection with those unborn generations. Ironically, a way to do this is to invoke past generations (Tost et al., 2008). People from the past are readily identifiable, and connections between their actions and our current state are often easy to discern. Consider, for example, veterans of World War II who were associated with the Allies. It is easy to learn who they were—in fact, many of us can trace our lineage to someone involved in the conflict—and to speculate on what the world would be like had they not done what they did. As such, many people feel an affinity for members of that generation. Such a reaction can make salient the idea that future generations will look back at us in the same way. Thus, policy makers can help themselves by invoking examples of past generations taking action, the consequences of which benefit us today.

The scale of public goods problems

Many public goods exist in such a way that citizens have a difficult time fully comprehending the problem. This is sometimes because the size of the problem is on a scale that exists beyond the person’s understanding and is just too large to contemplate (Quimby & Angelique, 2011). In other situations, this occurs because the good is packaged within a larger set of other goods. As an example of the latter, Kahneman and Knetsch (1992) asked some residents of San Francisco to indicate how much they would be willing to contribute to update equipment for disaster relief, while other residents were asked how much they would give to a general environmental fund and then how much of that they would like diverted into a disaster relief equipment program. In the former condition, the median amount given to the equipment fund was \$25.00, whereas in the latter condition, the median amount given to the environmental fund was \$50.00,

with only \$1.00 of that being diverted to the equipment fund. Kahneman and Knetsch explained the effect by arguing that a public good that is just one of many being considered for support loses value relative to when it is considered on its own.

An immediate implication of this phenomenon is that those who would be antagonistic toward provision of a public good could help themselves by reframing the good as either being enormous in scope or being just one part of a larger set of related goods that all need support. As an example of this, consider that climate change skeptics now largely accept that the Earth is getting warmer but frame the phenomenon as just one piece of a much larger set of global changes (Schmidt, 2010). This serves to embed global warming, which should make it seem, to many people, to be less of a problem than it actually is. Next, an argument for strict market solutions to climate change is that the problem is too complicated for individuals to be able to identify proper behavior changes. Because of this, industry should be given financial incentives to develop new devices that are more environmentally friendly, which consumers would then be required to purchase (see Jaffe, Newell, & Stavins, 1999, for a discussion of this argument). We saw in our discussion of antagonism that people will not hesitate to try to thwart provision of a public good, and these are two examples of how that might be done.

Note that the market solution discussed above is consistent with the notion of structural solutions that we discussed in the previous section. If we change the decision structure such that, for example, front-loading washing machines are cheaper than top-loading machines, this will help toward a goal of water conservation. Toward that end, policies that lead to changes in the attractiveness of decision alternatives are a good idea. The key is that such changes should not be the only strategy. What else might be done? One approach is to enhance the sense of group identity. It can be noted that although one person alone might not make a difference, a community of individuals will have an impact: Big problems call for mass efforts. Community-based efforts to provide and maintain public goods have had success in Third World cultures (see Western & Wright, 1994, for a set of case studies). Many of those approaches are consistent with the research on enhancing group identity, so there is no reason why these approaches could not work in more industrialized towns. Regarding the problem of an embedded good, it is an issue of reframing the discussion so as to highlight the good. A nice analogy to this is the challenge of encouraging people to attend to their cholesterol. Cholesterol is just one component of the complex problem of heart disease. Research indicates that, when presented in this fashion, patients tend to discount the importance of managing cholesterol level, but when

it is isolated as a problem in and of itself, they are more attentive (Goldman et al., 2006). Approaches similar to this could fruitfully be used to help people focus on specific goods outside of their larger context.

The general issue of trust

Regardless of which public good is at issue, perhaps the single most important thing that policy makers can do is work to build a sense of trust between citizens and themselves (Balliet & Van Lange, in press-a). There is even preliminary meta-analytic evidence revealing that trust is crucial for punishment to be effective in promoting cooperation in different societies (Balliet & Van Lange, in press-b): Punishment is more effective in high-trust societies (such as various locations in the United States and North European countries that were included) but less effective in low-trust societies (such as Greece or South Africa). It is possible that for effective forms of norm enforcement (punishment), it really takes the support and approval of others in your group (for a review, see Van Lange, Joireman, Parks, & van Dijk, 2013; see also Van Lange, Rockenbach, & Yamagishi, in press).

Moreover, research indicates that one of the biggest barriers to implementation of community-level changes in energy policy is distrust of those who created the changes (Culley & Angelique, 2010). We have discussed why trust is so critically important for instilling cooperation in others and how it can be built. It is not going to be sufficient for policy makers to say that science is on their side, and individuals can make a difference. Our examples above show how this can be undermined quite easily. It may seem obvious to say that policy makers who deal with public goods should build a trusting relationship with those whom they serve, but clearly this is not being done, so it does need to be stated.

What are the sources of this distrust? They are many: a belief that policy makers are being unduly influenced by corporate developers whose agenda differs from that of the public (Mendonça, Lacey, & Hvelplund, 2009); a belief that the methods for determining the cost of the good are unfair and do not incorporate public input (Jorgensen, Wilson, & Heberlein, 2001); a sense that the policy makers are themselves untrusting of citizens to make good decisions (Bowles, 2008); and a perception that policy tends to be inconsistently enforced (Corral-Verdugo & Frias-Armenta, 2006). If the policy involves reliance on a technological intervention, there can be an added concern that the best technology has not been selected or that the technology will be inconsistent with how citizens like to interact with the public good (Midden, Kaiser, & McCalley, 2007).

These are a number of hurdles to overcome, but it is clear that policy makers must strive to do so. How can

this be done? The principles that we earlier outlined in discussing how to promote trust—generosity, forgiveness, and promotion of group identity—are all applicable here. Sincere and concerted attempts to collect public input and a general “let’s work together” approach will do much to enhance group identity. Toleration of a certain amount of deviation from policy, at least in the early stages of implementation, will show that policy makers are forgiving. And last, a policy that gives citizens more than they might have expected—a more well-developed public good and broader access to it—will convey an image of generosity. Given how deep distrust in policy makers currently runs in many countries, attention to this dynamic is probably the first thing that needs to be addressed as we strive toward more consistent provision of publicly beneficial goods.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Notes

- Note that, in the long run, it is possible to “run out” of a charity. If it is chronically undersupported, it will eventually shut down. An unfortunate current example of this is the ending of free care for all children at Shriners Hospitals. According to Crosby (2011), some 60% of all families will now be expected to pay some portion of treatment costs.
- Strictly speaking, individualists do not “transform” the payoffs in the given matrix, as individualists simply focus on the set of outcomes to self, which requires no transformation.
- In the prisoner’s dilemma shown, a prosocial person’s concern with equality would emerge only over the course of repeated interactions, during which payoffs to self and others would have the potential to deviate from equality.
- For theoretical and practical reasons, we have restricted our focus to individual differences in SVO, trust, and CFC. However, additional individual differences have been shown to impact cooperation in social dilemmas. As an example, cooperation is higher among those low in narcissism (Campbell, Bush, & Brunell, 2005), low in dispositional envy (Parks, Rumble, & Posey, 2002), low in extraversion and high in agreeableness (Koole, Jager, van den Berg, Vlek, & Hofstee, 2001), high in intrinsic orientation (Sheldon & McGregor, 2000), high in sensation seeking and self-monitoring (Boone, Brabander, & van Witteloostuijn, 1999), and high in the need to belong, assuming the group is large (De Cremer & Leonardelli, 2003).
- Many studies have focused on the main effect of SVO and trust. However, at least two studies have shown that cooperation (e.g., preference for public transportation) requires both a prosocial orientation and high levels of trust, supporting the goal expectation hypothesis (e.g., Joireman, Van Lange, Kuhlman, Van Vugt, & Shelley, 1997; Van Lange, Van Vugt, Meertens, & Ruiter, 1998).
- Compare this with the other form of a public good, a *continuous* good, which can be provided in variable amounts

depending on total contribution. Public television is an example of a continuous good. With few donations, a station can still provide basic programming, and the quality of the programming will increase as donations increase.

7. Van Vugt and Park (2009) additionally suggested that this is an especial issue with males. Whether females are similarly inclined to automatically see out-groups as of hostile intent is not established.

8. We acknowledge that volunteering is sometimes undertaken for purely selfish reasons (Snyder & Omoto, 2000) and that large-scale volunteerism may discourage solution of social problems, as people will assume that there will always be enough help to manage the problem (Penner, 2004). Despite this, we contend that the act of volunteering is cooperative, as it contributes toward provision of a collective benefit.

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