Collective Control and Environmental Stabilization

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The fact that the control of perceptions tends to stabilize variables in the physical environment provides a useful focus for analysis when we move from considering the actions of isolated individuals to talking about social interactions. Although individuals have no direct access to the perceptions that other individuals are trying to control, the stabilization of the variables in the physical environment that correspond to the perceptions being controlled means that the effects of the control process are usually observable. As simulations have shown (McClelland 2004, 2006), when two or more individuals attempt to control the same variable in the same physical environment, their combined efforts result in environmental stabilization that is more tightly controlled than the individual could achieve on his or her own. All else equal, the tightness of control varies with the sum of the system gain factors characterizing the control effort that each actor is contributing to the joint action.

The most interesting result from simulation studies of actors engaged in joint control of an environmental variable is that the actors need not share the same reference conditions for the controlled variable in order for their combined control efforts to be effective. No matter whether the reference points used by participants in the joint action are perfectly aligned or are different, the impact on the environmental variable is essentially the same (McClelland 2004, 2006). However, when the actors involved in the joint control of an environmental variable use different reference points in attempting to control the variable, their actions will come into conflict, because the outcome of this "collective control process," as it has been called (McClelland 2006), will stabilize the controlled variable at a "virtual reference level" (Powers 2005: 267) that ordinarily does not match the preference of any of the actors involved.

When the virtual reference level that emerges from a collective control process stabilizes the environmental variable at a compromise level that is different from the participants' various preferences for that variable, each actor involved in the collective control process will experience perceptual errors and take action to bring the variable as

perceived back into line with his or own individual reference conditions. But because the individually preferred reference conditions differ among the actors involved, no environmental solution is possible that will satisfy every participant. Thus, when participants disagree about the reference conditions to use, collective control processes inevitably produce some degree of conflict (depending on how sharp the differences are), as the attempts by participants to bring the variable into line with their own preferences tend to cancel each other out, leaving the controlled variable in a stable condition, but nevertheless one that is mutually unsatisfactory from the participants' point of view (see McClelland 2004, 2006).

From the perspective of PCT, every kind of social process is a process of collective control. Hence, every social process results in stabilization of one or more physical variables in the shared environment of the participants in the social process. Different kinds of social processes stabilize different kinds of variables, of course, and the stabilization can take different forms depending on the variables stabilized. The variables stabilized can range from simple to complex within the hierarchy of physical variables: for example, a social process can stabilize a variable as simple as a sensation, as when a choir hums a note together at a single frequency; or as complex as a movie video, as when a film production company combines visual images, sounds, actors' performances, voice-over narration, and computer effects to construct a reproducible artifact that displays the constituent elements in an intricate set of relationships. By stabilization of a physical variable, I mean stabilization against disturbances, that is, reducing the extent of the fluctuation in a variable that would occur in the absence of the control process. Such stabilization can take the form of increasing the predictability, repetitiveness, or uniformity of the variable, or even the prevention or near elimination of certain types of fluctuation in the variable.

The social processes of collective control can stabilize many different kinds of physical variables. Some social processes result in construction and maintenance of a built and manufactured environment, which includes relatively permanent buildings, roads, machines, and other manufactured objects. Other social processes are involved in obtaining a predictable food supply. Yet other social processes impose predictability on the physical appearances of human bodies, as people conform to fashions of grooming and wearing apparel. Many rituals create uniformity in displays of emotion by the participants. Some work processes impose predictability and repetitiveness on the patterns of physical action of the workers. Other work processes result in the duplication and repetitive dissemination of images, words, or other sounds on pages, phones, TV screens, or computer screens. In whatever form it occurs, some kind of

stabilization of the environment is the inevitable outcome of a collective control process.

Very often, the people engaged in a collective control process are not intent upon stabilizing physical variables, per se, but variables at one or more of the higher levels of the perceptual hierarchy, variables that by their nature are somewhat abstract. Religious observances, for instance, are often intended to produce uniformity of beliefs or ethical values among the participants, which from the PCT perspective are principle-level perceptions. Employees in a business may work together to implement a sales campaign, which in terms of PCT would be a program-level perception. Although abstract perceptions such as religious beliefs or sales campaigns don't correspond to any single physical perception, to stabilize these perceptions the participants in the collective control process must control a variety of lower-level physical perceptions, and their control of the lower-level perceptions will have an observable impact on their shared environment, as the corresponding physical variables are stabilized. Participants in a religious observance, for instance, may assume suitably solemn expressions while singing or chanting together, and the employees implementing a sales campaign may make phone calls, create web pages, or produce slide presentations with lots of pictures and colored graphs. The physical evidence of their control of these lower-level perceptions provides crucial feedback to the participants as they attempt to control their own higher-level perceptions, which might involve perceiving unanimity of belief among the congregation or successful implementation of the sales campaign. And the physical stabilities emerging from these collective control processes can supply evidence to outside observers, as well, that the control process is taking place, provided that the outside observers have the necessary perceptual organization for detecting these more abstract stabilities.

This theory of collective control processes is intended to apply to social processes both micro and macro in scale. Because other sociologists have already explored several important applications of control theory to micro processes (e.g., Burke and Stets 2009; Heise 1979, 2007; McPhail 1991), my discussion here will focus on macro social processes, by which I mean processes of large scale—society-wide or global in scope—and of relatively long duration—continuing for decades or centuries. Although the principles that I am presenting apply equally well to smaller scale and shorter-lived control processes, even to brief dyadic interactions, the macro social processes that I will discuss in my examples can serve nicely to illustrate my arguments. Furthermore, pointing out how well PCT can apply to macro social processes will help to demonstrate the wide range and flexibility of the theory.

The stabilization of a shared environment emerging from social processes has many potential benefits for the participants. First of all, as noted above, the stability resulting from collective control processes is generally tighter or more uniform than could be produced individually. Predictable stabilities in the environment also provide the individual with a platform for successfully controlling higher-level and more complex perceptions, as when predictable access to food and shelter allows the individual to concentrate on tasks other than feeding oneself and sheltering from the elements. Obviously, the manifold benefits of the collective control emerging from social interaction are too numerous for me to list them all here. However, collective control processes often have drawbacks as well as benefits. I turn next to explaining these drawbacks and describing some additional consequences of the fact that collective control processes can stabilize environmental variables.

The first drawback of environmental stabilization by collective control processes was mentioned above: collective control is often accompanied by conflict (see McClelland 2004, 2006). Unless the reference conditions used by all the participants in a control process are precisely aligned—something that is highly unlikely if thousands or millions of participants are involved—at least some of the participants will end up acting at cross purposes with each other in their attempts to control their own perceptions of the variable in question using their own reference values. Participants in a social movement, for instance, sometimes disagree among themselves about their reference values for the pace of change that participants must perceive in order to feel that the movement has been making progress, and thus some will seek to push on rapidly, while others hold back. The strategies actually pursued by movement organizations as a whole may then reflect an uneasy compromise (the virtual reference level) that satisfies neither the radical nor the conservative wings of the movement, and the conflict and disunity among members of the movement may threaten the movement's goals.

Even if participants in a collective control process share precisely aligned reference values for controlling their own perceptions, the outcome of the process may involve conflict. Competitive social processes like sports leagues or democratic political systems, for instance, produce environmental stability and conflict simultaneously. Each participant in the competition wants essentially the same thing, to win, but since no collective outcome is possible in which all participants are winners, conflict is assured. Typically such conflicts are managed by appealing to rules that prevent participants from going too far (by invoking another set of collective control processes to limit this "extreme" behavior). Agreements between the parties about higher-level perceptions, such as the goal of playing the game and not just winning, can also help to keep such

conflicts in check. The fact that all participants in the collective control process agree to the higher-level goal of playing the game, win or lose, makes conflict management possible.

If parties disagree about higher-level goals, however, conflict management can break down. Under those conditions competitive systems, especially two-party ones, tend toward polarization, with both parties pushing the conflict to their own limits of output, so that a stalemate ensues, unless one party is markedly stronger than the other. Powers (2005: 266-268; see also McClelland 2004) has described how the interactions of control systems can produce this kind of deadlocked conflict, and he argues that a "dead zone" of "little or no control" (p. 267) emerges in the disputed region surrounding the virtual reference level of the collective control process. Because both parties lack the power to shift the terms of their interaction appreciably, such polarized conflicts can last indefinitely in spite of high levels of tension. Contemporary politics in the United States provides instructive examples of this sort of frozen polarization. Even though such deadlocked conflicts are felt as unsatisfactory by nearly every participant, they can linger indefinitely, or until one side or the other runs out of the resources or the will to carry on the fight. Such conflicts can also be put aside at least temporarily when a powerful third party comes on the scene and the erstwhile combatants unite to resist the disturbances caused by that third party (see McClelland 2004). A more permanent ending to a deadlocked conflict may occur when participants on one side or the other reorganize their perceptions (see below) and reframe their perceptions of the contentious issues enough to make the fight irrelevant.

Another commonly occurring drawback of collective control processes is what an economist might describe as "opportunity costs." The stabilization of some parts of a shared environment for purposes of attaining collective goals may reduce the opportunities for people in that environment to pursue a range of other possible goals. Powers has described this problem as a matter of "degrees of freedom" (1989). The control systems in the brain, he argues, can control many different perceptions at once, but physical limitations of the human body put an upper limit on the number of perceptions that can be controlled simultaneously at any given level of perception. He describes this limit as the degrees of freedom available to the actor. Controlling a higher-level perception often involves keeping the lower-level perceptions that contribute to that perception stabilized, and that stabilization may then preclude the control of other possible perceptions at the higher level. For example, one can read a book or go swimming, but swimming requires immersing oneself in a stabilized part of the environment (a swimming pool, in this case) and carrying on a stabilized set of bodily movements that are incompatible with reading a book.

In general, the environmental stabilization resulting from collective control facilitates some perceptions and activities while reducing the degrees of freedom for perceiving and doing other things. For example, when a new swimming pool is constructed on the site of what used to be a library, swimming is now made possible, but finding books to read there is pretty much ruled out. For a particularly good example of this simultaneous enhancement of opportunities combined with limitation of degrees of freedom, consider the collective control processes involved in maintaining private property rights. When an object or a piece of real estate is declared to be private property, the owners gain the freedom to use this property however they choose without interference from anyone else, while non-owners are restricted from gaining access to or using this piece of the common environment for any of their own purposes.

Another good example of this simultaneous enhancement and reduction of the degrees of freedom emerging from collective control is the increasing standardization of commercial and public spaces in contemporary urban centers worldwide, as roads, train stations, airports, malls, office buildings, and hotels are built to similar if not identical plans. Although this stabilization and predictability serves the interests of businesses and tourists, Powers (1989) argues that the standardization reduces degrees of freedom overall for most individuals, with more and more individuals being channeled into the relatively narrow range of behavior facilitated by the standardized environment, and as a result coming into competition for use of the standardized amenities. The construction of super highways into urban centers illustrates this argument very nicely. Construction of the limited-access highway cuts off connections between points on either side of the road that were formerly in easy contact, and such highways are often the sites of traffic jams as commuters flock to the new route but then have to contend with each other for space on the road, so that their ability to travel quickly between the periphery and the center of the city disappears at predictable times each weekday.

The simultaneous enhancement and reduction of the degrees of freedom emerging from collective control can have another downside: social inequality. As increasingly large parts of the environment are stabilized in line with the needs and preferences of some groups, other groups may find their degrees of freedom considerably diminished. One useful definition of social power from this perspective is that the most powerful individuals and groups are those who can stabilize a shared environment in ways that facilitate the control of their own perceptions while reducing the degrees of freedom available to others. We have seen how the institution of private property depends on a collective control process that advantages owners of property over those without property by assigning the degrees of freedom for use of portions of the physical

environment to some people and not others. In this connection, money might be regarded as degrees of freedom made portable, so they can be easily moved from one environment to another.

Racism and sexism provide especially vivid examples of how social inequality results from stabilizing the physical environment in ways that serve the interests of some groups over others. Both of these broad institutions of inequality depend on myriad environmental stabilities, including pervasively distributed images and writings that allow individuals in the advantaged groups to control their own perceptions—perceptions of their group's superiority to other racial groups or perceptions that men are better than women—but are inconsistent with controlling a perception of self-worth for members of the disadvantaged groups. These pictures and documents are reinforced by patterns of discriminatory speech and action on the part of millions of people, as well as patterns of segregated residence and segregated activity. Individuals wishing to resist the impact of these institutions of inequality in their own lives keep running into environmental stabilities that are consistent with higher-level perceptions that one group is superior to another and, by the same token, which reduce their degrees of freedom to control other perceptions that would be inconsistent with these hegemonic perceptions of inequality.

Once in place, the widely distributed environmental stabilities supporting these and other institutions of inequality make these systems hard to change, because completely removing the inequalities would require massive and society-wide changes in the physical environment. The difficulty of making such changes is one of the reasons that these systems of inequality tend to be reproduced from generation to generation. Another reason for the reproduction of these systems of inequality is that individuals growing up in environments that support such inequalities tend to adapt to those environments by reorganizing their own control systems to control their perceptions as well as they can, given the environmental stabilities that they have to deal with. These physical stabilities then become part of the perceptual world that they take for granted, and they serve as the basis for forming higher-level perceptions of identity and relationships. When change in a system of inequality requires both massive physical changes and psychological reorganization of control systems for large numbers of people, the pace of change tends to be glacial.

The stabilization of our physical environment by collective control has yet another downside. Stabilization comes at an energy-flow price. The second law of thermodynamics tells us that the creation of order in some parts of the environment can only be accomplished by increasing the disorder in other parts, so that stabilizing the environment in one place means destabilizing it in another. Worldwide climate

change provides the most striking current example of this problem. The massive physical stabilities of architecture, transportation, communication, manufacturing, resource extraction, and food production that support the everyday activities of individuals in contemporary urban societies have been achieved at the cost of destabilizing global weather and increasing the risks of catastrophic storms and rising sea levels. Another familiar example of the problem of simultaneous creation of order and disorder is the way that the building of shiny new urban environments goes hand in hand with the despoiling of remote regions from which resources are extracted for the raw materials and energy sources needed to construct and maintain the urban infrastructure. In this and similar cases, the collective control process that stabilizes the environment for the benefit of more privileged groups also reduces the degrees of freedom available to disadvantaged groups, as when, for instance, inhabitants of the remote regions from which resources are extracted find their familiar environments and customary ways of life seriously disturbed.

Because macro-scale collective control processes tend to stabilize environments in ways that generate conflict and reduce the degrees of freedom available to certain segments of a population, it frequently happens that individuals living in such stabilized environments find themselves unable to control perceptions that are important to them. By important perceptions, I am referring to a wide range of possibilities: from highly abstract perceptions, like feelings of personal success or a sense of self-worth or the perception of being surrounded by supportive friends, to much more concrete perceptions, like getting enough to eat and having a roof over one's head. PCT predicts that inability to control important perceptions will initiate an internal process of reorganization of the individual's control-system hierarchy. This reorganization is a random and evolutionary process (see Powers 2005: 184-204). The reorganizing individual keeps trying out different modes of perception and action until something works, that is, reduces the errors that the individual is experiencing. When something works, the reorganizing process stops, and the newly reorganized connections between control systems become a more permanent feature of the individual's control-system hierarchy.

Because individuals in environments that limit their degrees of freedom are likely to start reorganizing their control systems, and because reorganization often results in new ways of seeing and doing things, the macro-scale collective control processes that provide environmental standardization and stability tend at the same time to provoke innovative behaviors. Moreover, when environments result in inequality, the segments of the population most limited in their degrees of freedom are the ones most likely to innovate. Whether such innovations are seen as problematic depends largely on the

context. When observers see members of disadvantaged segments of the population finding innovative ways to control their perceptions, they are likely to regard the innovative behavior as deviant. Sociologists have long been familiar with the concept of innovative deviance (Merton 1968: 193-194), as, for instance, when individuals who are blocked from reaching culturally endorsed goals turn instead to criminal means. Innovative behavior in highly competitive environments that are culturally valued, such as science or the arts, is more likely to be regarded as evidence of creativity. Highly competitive environments are similar to other unequal environments, however, in that they tend to restrict the degrees of freedom of those who are not the winners of the competition, so that losers are often prevented from controlling perceptions that are important to them, which leads to reorganization of their control systems and increases the likelihood of innovative behavior.

The process of reorganization of an individual's perceptual control systems also has an emotional dimension (see Powers 2005: 252-261). When an individual loses control of important perceptions for any length of time, it feels bad. The inability to deal with disturbances or correct errors may be felt as frustration, pain, or depression, depending on how long it continues. If the source of the offending disturbance is obvious, the individual may feel anger or rage toward that source. When reorganization finally brings important perceptions back into control, the emotion likely to be felt is relief or even elation. An individual confronted with a stabilized environment that restricts his or her freedom and frustrates the achievement of important goals is likely to feel anger, and the individual may then act on that anger by turning to violent disruption or destruction of the environmental rigidities seen as causing the frustration.

By disrupting the collective control processes maintaining stabilization, violence serves to destabilize an environment felt to be too confining. This analysis implies that stabilized environments with built-in inequalities, in which some segments of the population find their degrees of freedom severely restricted, are more likely than less stringently controlled environments be sites of violence. Of course, we can also predict from PCT that when violence disrupts those collective control processes, the response of individuals participating in the collective control processes will be to redouble their own control efforts, perhaps by turning to what sociologists refer to as social control, such as sanctions or incarceration, which from the perspective of PCT can be defined as efforts to restrict available degrees of freedom even further for the segments of the population seen as offenders or criminals. When the same kind of conflict dynamic arises between countries, it can lead to violent reprisals and terrorism or open warfare.

My analysis of the environmental stabilities that support inequality has pointed in two directions. On the one hand, entrenched institutions of inequality like sexism and

racism can be difficult to change because of the sheer number of stabilized environmental arrangements that contribute to these perceptions of inequality, as well as to the way that individuals growing up in such environments tend to build their own hierarchies of perceptual control systems on the taken-for-granted assumption that these environmental arrangements reflect some unchangeable reality. On the other hand, if the environmental rigidities restrict degrees of freedom for the less privileged segments of the population too much, the likely outcome is, at best, a constant stream of behavioral innovations, as those suffering from restrictions keep reorganizing their control systems to find better ways to control important perceptions. At worst, the less privileged segments engage in violence and other kinds of intentional destabilization of the environments that restrict them. The conclusion to be drawn is that environments of inequality are unlikely to be static, even if social and cultural change come slowly.

More broadly, my analysis suggests that virtually all kinds of environments stabilized by macro-scale collective control processes will be sites of chronically ongoing social change. Because each individual develops a unique organization of perceptual control systems, the environmental facts on the ground in highly controlled environments will never make room for every individual within those environments to control important perceptions satisfactorily. This inevitable lack of fit between individual and environment will always mean that some individual participants are experiencing negative emotions and engaged in reorganizing their control-system hierarchies. Thus, there is always a creative or destructive edge to macro-scale collective control processes, as some segments of a population are constantly reorganizing their perceptions and even striking out against the rigidities that they perceive as restricting their degrees of freedom. The stabilization of a social environment never can be fully settled.

Two other predictable processes also contribute to ongoing social change. As participants enter and exit collective control processes that stabilize a given environment, the virtual reference levels for these control processes continually change, if only by a very small amount in macro-scale control processes. We see this gradual change process occurring for instance, in the diminishing levels of discrimination toward gays and lesbians in the United States as cohort replacement takes place, that is, older generations die off and younger generations grow up who are more familiar and comfortable with out-of-the-closet gays and lesbians.

More rapid kinds of social change can occur when the reorganization of one individual's perceptions results in a creative solution to a problem widely felt within a given segment of a population. Other individuals who observe the behavior of this individual may quickly pick up this new way of seeing and doing things, especially when

their own perceptual hierarchies contain lower-level control systems similar to those of the creative individual, so that all that is necessary for them to imitate the solution is to "plug in" the new higher-level perceptual pattern that solves the problem. Thus, behavioral innovations can spread rapidly by imitation through a population, with the accompanying rapid pace of social change, expedited even further when a mass-media broadcast of the innovation gives large numbers of people the opportunity to observe the new pattern. We see this kind of rapid change process occurring with the spread of fads and fashions, as well as shifts in "public opinion" following the broadcast pronouncements of politicians or media pundits.

My application of PCT to macro-scale social processes has shown that PCT can provide analytical leverage for explaining social mechanisms behind some of the core concerns of sociological theorists: social order and conflict, social power, social inequalities and their reproduction, deviance and social control, and social change. The analysis has also hinted at how the analysis could be extended throw light on other topics of sociological concern, such as globalization, property and money, traffic jams, environmental degradation, violence, the diffusion of fads and fashions, and political gridlock.

My analysis has been based entirely on a relatively simple set of assumptions: (1) what PCT tells us about the psychology of individual human beings, and (2) the fact that collective efforts to control similar perceptions can result in the stabilization of variables in the participants' shared physical environments. Thus, I have had no need for additional assumptions about shared practices, emergent properties, hidden causal powers, micro-macro links, reflexive deliberations, or any of the many other abstract concepts to which contemporary social theorists have resorted in their efforts to give a coherent account of how social structures are created and maintained. Everything that I am talking about is open to observation and can in principle be mathematically modeled. Even the perceptual variables that individuals are controlling, which because they are internal to the individual are not directly observable, can be ascertained by means of what Powers (2005: 234) calls "The Test for the Controlled Quantity." While the implications of my analysis are far from completely worked out, I would argue that the parsimony, flexibility, and material tangibility of this PCT approach give it some decided advantages over other more popular approaches to social theory.

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