INSTITUTION: THE CONTROL OF SOCIAL PERCEPTION - TOWARD A THEORY OF MINORITY-DIRECTED INSTITUTIONAL CHANGE

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INSTITUTION: THE CONTROL OF SOCIAL PERCEPTION -
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ABSTRACT

This dissertation seeks to make progress toward a theory of minority-directed institutional change. It begins with a review of research on urban sociology and how, despite tremendous technological and legal change, the fact of institutional racism remains. It then reviews relevant portions of Original Institutional Economics (OIE) thought describing the relationship between individuals and institutions, ending with an OIE theory of institutional change. It then shows how a theory of human psychology, Perceptual Control Theory (PCT) is largely analogous to OIE while also helping to clarify and update some portions of it. Extending PCT into the social realm and combining it with some insights from both neuroscience and network science enables the development of a more complete understanding of institution formation. This helps explain why institutional change is so difficult, why efforts to change institutions must focus on changing social perceptions, and how a powerless minority might more successfully do just that. Though the case studied here is institutional racism, all purposeful social change inevitably begins with those whose opinion is initially in the minority. Therefore, a successful theory of minority-directed institutional change could be applied to a wide variety of other issues, including global climate change and appropriate policy-setting for modern monetary

economies, where those recommending potential solutions are actively opposed by entrenched and powerful interests.

APPROVAL PAGE

The faculty listed below, appointed by the Dean of the School of Graduate Studies, have examined a dissertation titled “Institution: The Control of Social Perception—Toward a Theory of Minority-Directed Institutional Change,” presented by Franklin Arthur Lenk, candidate for Doctor of Philosophy, and certify that in their opinion it is worthy of acceptance.

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Needless to say, I took the red pill.

I want to thank all of my professors at UMKC. In particular, I want to thank Peter Eaton and Doug Bowles, who not only mentored me throughout my ten years in the program, but who also became my friends. Doug's courses allowed me to develop the concept of a synthetic social science—synthetic because it blends many strains of

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My mom and dad created a home where knowledge was valued and science the path to knowing (thank you for that telescope, Dad), taught me to think for myself (I'm not jumping off any bridges, Mom), and encouraged excellence ("You want to be a plumber? Be the best plumber!").

My sons, Lyon and Adam, always understood when I was busy, working late, stressed out and not fully present when I should have been. Yet, still they love me. As one of my rabbis said, " 'I love you,' that we understand. 'I am loved by you,' that is the miracle beyond comprehension." You two are my miracles.

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But it was not what she did for me that helped most. It is what she does for her students at Scuola Vita Nuova, a small charter school in the urban core of Kansas City, Missouri, that most inspires me. As a researcher, I stand outside the problem, working at a 30,000 foot level using theory, data and analytics. As a teacher, she stands inside the problem, working directly with kids to help them achieve their full potential. Daily, she brings home stories of her students' incredible worth, their warmth, laughter and humanity, as well as their heartbreaking challenges and knowledge and resource gaps. These stories make me want to work even harder on the system changes necessary to eliminate the social and economic barriers that keep her kids—and they are really all *our* kids, aren't they?—from being and achieving their best. She breathes authenticity and life into my theories and helps ground them, and me, in reality. Without her, my head would get so full of ideas, and itself, it would float off into meaninglessness. With her, my soul found its mate, I am renewed and the impossible seems possible…someday, if not today.

Finally, I am reminded that the most most often repeated commandment in the Torah isn't the "Golden Rule," but "*Ahavat ger!*" This is typically translated from Hebrew as "Welcome the stranger," but literally means, "*Love* the stranger." In the Torah, God calls on the Israelites to love the stranger because they were once strangers—slaves—in the land of Egypt. Today, this commandment calls on us to see the common humanity in all those who are not like us and treat them as one of our own.

It is in this spirit, to help me live up to this ideal, that I wrote this dissertation.

DEDICATION

This is dedicated to the students of SVN Charter School, and all children everywhere, who deserve a world without systemic barriers to successful and useful lives.

CHAPTER 1

INTRODUCTION

"Never doubt that a small, committed group of citizens can change the world. Indeed, it is the only thing that ever has."

- attributed to Margaret Mead, date unknown

Despite these encouraging words, to the bane of activists everywhere, the world remains a stubbornly difficult thing to change. According to Original Institutional Economics (OIE), this is because there exist "prevalent habits of thought," or institutions, that structure society. Institutions resist change because many benefit from the current structure, and those that benefit most tend to vigorously defend current structures with the not insignificant resources at their disposal. The chances for a small group, especially a powerless minority, to change a defended institution, then, are vanishingly small. How might they be improved?

It is clear that more is required than changes in law. Despite the passage of nearly 50 years since the enactment of major civil rights legislation outlawing discrimination on the basis of race in employment and housing, the life chances of blacks and whites remain significantly different. Reeves (2014) finds that while white children born into the lowest income quintile have a roughly equal chance of ending up in any income quintile as an adult, similarly poor black children have a 50 percent chance of remaining in the lowest household income quintile and almost no chance of climbing to the top income quintile. That blacks and whites achieve different incomes even when born into similar economic

circumstances suggest that despite changes in law, there is something about the structure of society that is causing these unequal outcomes.

Why does such a structure persist? Galster and Hill (1992) explain that blacks experience systematically more obstacles to opportunity than whites as the result of interaction between place, power and polarization, the latter being their term for racial disparities. While each affects the other, the causal chain that links them runs as follows: "Residential segregation (place) and economic deprivation (one aspect of power) have built on the history of legal segregation and discrimination to reinforce social and economic polarization. Polarization then feeds back to reinforce differences in place and power." They add that change is difficult because it requires a redistribution of opportunity and "The majority will feel extremely threatened" (p. 7).

The causal chain is actually a loop exhibiting positive feedback and so is self-reinforcing, which they suggest is similar to Myrdal's (1944) model of cumulative causation: "Whites' prejudices and their power to discriminate against people of color result in segregation and inter-racial economic disparities which, in turn, reinforce the original prejudices" (p. 11).

How can this self-reinforcing cycle be stopped? That is the problem wrestled with here. We review the urban sociology literature and find that at root are widely held perceptions and racial prejudices. Such prevalent habits of thought are the very definition of an institution, and so we turn to Original Institutional Economics (OIE) to better understand the nature of institutional change. OIE has long embraced a view of economic

agents as having purposes and differential power, and where prevalent patterns of thought (including but not limited to perceptions and prejudices) are critical to understanding how those purposes are achieved or frustrated. We place a particular emphasis on understanding the relationship between individuals and institutions since the need for change is likely to be first perceived by a relatively small number of individuals seeking to change the larger society. The OIE theory of institutional adjustment is reviewed and found to be incomplete.

In search of more guidance, we then examine Perceptual Control Theory (PCT), a psychological theory that specifically considers the relationship between perceptions and power, defined as control over one's perceived environment to achieve one's purposes. PCT is found to be analogous to OIE in several important aspects, while at the same time unifying and clarifying certain parts of it, especially the nexus between individual and institution. It also provides some additional insight into necessary conditions for institutional change. Though PCT was originally developed to explain individual psychology, more recent extensions allow it to be considered as a basis for social theory as well.

This recent work helps explain how "habits of thought" become prevalent. In particular, habits at the individual level and institutions at the social level are shown to be composed of the same "stuff." Armed with this deeper understanding of institutions, a theory of minority-directed institutional change is developed. Along the way, insights from neuroscience and network science are added to it so the theory attempts to bridge the ontological gap from neural network to social network.

Finally, this theory is applied to the problem of institutional racism with which we began and conditions for successful minority-directed institutional change are derived. The means of creating some of those conditions, however, are not completely clear. Thus, the world remains a stubbornly difficult thing to change, but perhaps the insights derived from this analysis make the chances somewhat less vanishingly small.

CHAPTER 2

REVIEW OF LITERATURE

Urban Sociology of Institutional Racism

Galster (1992) elucidates a cumulative causation model of the creation and persistence of an underclass as the result of interactions among seven different aspects of people, place and labor markets. First, the underclass exhibits diminished capacities (education, skills, work histories, etc.) and substandard material conditions relative to the rest of the population. Second, this disparity breeds diminished psychological conditions, including pessimism, anger and apathy, which leads to deviant or uncontrolled behavior—welfare dependency, crime, drugs, and unwed births—that further diminish capacities in both the present and future generations. Third, the rest of the population exhibits prejudices against poor blacks, prejudices that are reinforced by their low standard of living and non-standard behaviors. Fourth, these prejudices play out by physically isolating poor blacks in deteriorating poor central city neighborhoods while, fifth, creating barriers to exclude them from suburban communities. Sixth, the cumulative effect of spatial isolation, prejudices, pessimism, self-defeating behavior and educational deficiencies work to exclude the underclass from higher paying jobs (the "primary" sector) and so, seventh, segregate underclass labor force participation in the low-wage (i.e., "secondary") sector of the economy where jobs have little potential for earnings increases and the performance

of which does little to enhance either the hard or soft skills needed for work in the primary sector. Low incomes then reinforce the pessimistic attitudes toward work and the inadequate standards of living experienced by the underclass, perpetuating the circle of cumulative causation.

As explained by Galster, this model identifies the endogenous factors creating and perpetuating an underclass. There are also exogenous factors that are important including, 1) the advent of a post-industrial society which lowered opportunities for low-skilled workers to earn middle-class incomes, 2) the building of interstate highways which destroyed many African-American neighborhoods, and 3) the subsidizing of mortgages for new homes in homogenous neighborhoods but not for older homes in racially or economically mixed areas. Nonetheless, these were imposed on top of a system already designed to segregate opportunities by race, and they simply added fuel to fire, intensifying the strength of the linkages between the seven factors and the extent of their cumulative impact.

Aside from identifying and describing the reinforcing elements of this model, its most distinguishing feature is its emphasis on the role of psychological factors such prejudices, beliefs, and perceptions on maintaining existing social and economic relationships. Standard economic models of human behavior would consider such things to be “tastes” or “preferences,” and as such, given from outside the economic system and not the purview of formal analysis. The study of concentrated African-American poverty, however, requires perceptions and prejudices be brought inside the analysis to explain

their formation, adoption and persistence, especially to understand how they might be significantly changed. In particular, the interaction between social structure and human development must be more fully examined. The above model is at least a beginning, showing how material conditions produce psychological adaptations and behaviors that, unfortunately, often reinforce destructive perceptions, beliefs and prejudices.

Also important is the model's description of agency. Agency isn't uniformly distributed. Agency primarily accrues to the powerful, as they have the ability to define who is "other" and exclude and segregate them on the basis of them being somehow less, inferior or dangerous. This plays out in both the segregation of residences into those that are resource rich and those that are resource poor, and the segregation of labor-force opportunities into those occupations with many opportunities for advancement and those with few.

Galster goes on to characterize three different kinds of policy interventions aimed at reducing the black underclass: "break the linkages," "reverse the cycle," and "establish a parallel system." He then criticizes them in light of his model of cumulative causation.

"Break the linkages" strategies attempt to intervene in one strategic place to stop the self-reinforcing nature of system. Such programs include anti-discrimination laws, job training and affirmative action. Galster's main criticism of these is that even if effective, enough of the remaining parts of the system remain in place so that at best, they may reduce the rate of deteriorating circumstances for the underclass, rather than reverse

trends. In other words, the system is resilient and adaptive, and so single, “silver bullet” policy changes are unlikely to be broadly effective.

“Reverse the cycle” strategies attempt to use the self-reinforcing nature of the system, but implement policies that run it in reverse so that vicious cycles become virtuous ones. One example of such a policy discussed by Galster is dispersing subsidized housing to de-concentrate the poor and move them closer to where opportunities are growing. If successful, this should provide the role models needed to reinforce successful behaviors but are no longer prevalent in the inner city while providing tangible economic payoffs for adopting them, as suggested by Wilson (1987). But, according to Galster, these strategies have met with mixed success. Merely dispersing low-income housing is not sufficient to produce a change in the attitudes and behaviors of either the displaced urban poor or their new middle-class white neighbors, making access to opportunity a function of more than just geographic proximity.

Finally, “establish a parallel system” strategies attempt to reproduce inside the distressed area the community-owned businesses and other institutions needed to provide access to primary as well as secondary sector jobs. Galster appears to be most sympathetic to this strategy, but questions whether a parallel system can be viable in the long-run without support from the mainstream community. If not, then it is not really a parallel system and will run up against mainstream opposition as subsidized minority businesses compete against unsubsidized mainstream businesses. Even if the parallel system requires no economic support from the mainstream, Galster questions whether it can be

constructed in a way that does not fuel mistrust on both sides, which would likely result in the withdrawal of the political support needed to maintain parallel systems.

Hence, Galster successfully shows why most interventions to ameliorate concentrated minority poverty in the urban cores of metropolitan areas have met with limited success. The intense entanglements between the seven mutually reinforcing factors enable the problem to seemingly have a will of its own, repeatedly demonstrating an ability to adapt and adjust to interventions and continue on its own path.

Briggs (2005a) similarly identifies "an uneven geography of opportunity by race and class" (p. 4) where the disadvantaged live in communities that are "isolated and isolating traps with second class support systems" rather than "communities that serve as stepping stones to opportunity, political influence and broader social horizons" (p. 3). This uneven geography follows an implicit but well-defined policy—containment plus sprawl. This policy is being followed, even as the country's population becomes more racially and ethnically diverse:

> Since tools for regulating land development at the local level were developed in the United States a century ago, a diversity of race and class has been contained, ensuring that disadvantage is concentrated in particular places. In the 1990s, as the population became more diverse, it was not the fact of containment that changed significantly, but the shape of the 'container,' which morphed to include many at-risk suburbs. (p. 8)

While containment concentrates the poor minorities, well-off households follow what Briggs, citing Robert Reich, calls a "the secession of the successful" (p. 9) strategy. "One way Americans separate themselves from urban problems is by leaving them behind and creating new local governments" in the suburbs. "From the standpoint of race and

housing choice, sprawling new growth creates exit options from older, built-up areas—but more often for white households and middle- and upper-income minorities than for other groups."

This simple but effective strategy creates the illusion of progress without changing underlying social relationships. Rates of housing segregation as measured by the index of dissimilarity *have* declined over the decades, albeit very slowly. Minorities *have* gained political power in many cities, though mainly because whites have left. The suburbs *are* growing in diversity. Whites, seeing the progress in anti-discrimination, believe the problem is solved. Blacks, seeing their increasing political power, believe the current residential pattern offers advantages that outweigh any attempts at further integration. The result is an absence of social conflict despite the fact that containment plus sprawl perpetuates systemic racial inequality and leaves intact the implicit policy of dividing metropolitan areas into places of opportunity largely inhabited by whites and places of isolation largely inhabited by blacks and other minorities.

There are many ways in which this container is held together, and several are described below. But underpinning them all are the attitudes of blacks and whites regarding living together. Charles (2005) explores these attitudes using an innovative survey technique as part of the 1992-94 Multi-City Study of Urban Inequality (MCSUI), which examined racial inequality in four metropolitan areas—Atlanta, Boston, Detroit and Los Angeles. Survey respondents were shown cards with 3 rows of 5 clip-art houses and the respondent was told to assume that he/she lives in the middle house. The houses are

colored as either white, black or grey and each color represents a race or ethnicity—white for Whites, black for Blacks, grey for either Asian or Hispanic, depending on which ethnic group was being surveyed. The respondent is shown a series of cards depicting his/her house as surrounded by varying proportions of own-race households and other-race households. (The "other" race was randomly chosen for each respondent.) The respondent is asked how willing he or she would be to move to such a neighborhood.

What emerges is a very strong ordering, where whites are the most preferred as neighbors, blacks the least, and Hispanics and Asians in between. This hierarchy holds regardless of the race of the respondent. All race and ethnic groups prefer to live in neighborhoods where their own racial/ethnic group is in the majority. However, it appears that minorities prefer neighborhoods with "a greater number of co-ethnic (nonwhite) neighbors than most whites could tolerate in their own neighborhood—suggesting that racial change in neighborhoods might inevitably lead to 'tipping' toward a majority race makeup rather than a stable mix" (Charles, 2005, p. 51).

Few members of minority groups prefer to live in segregated neighborhoods, either in a ghetto entirely inhabited by their own ethnic group or in one where they are only token representatives of it. Moreover, a majority of respondents in all racial and ethnic groups say they would be willing live in neighborhoods where 1/3 of residents are from a different group. According to Charles, this level of expressed willingness to live in integrated neighborhoods is a significant increase from the 1970s, when the survey was first given.

Charles then examines what underlies the preference ordering and provides three alternate explanations. First, it could be that class is the real driver and that race is merely being used as a proxy. Second, perhaps all groups are ethnocentric and so naturally have a preference for living with others like themselves. Finally, perhaps preferences are driven more by prejudice against an "out-group" than by desire to live with co-ethnics.

Charles reviews the evidence for each and finds that:

1) The incomes and expenditures on housing of whites and minorities overlap considerably, so the prevalence of segregated neighborhoods cannot be explained by class differences, at least as defined in terms of income groups.
2) Whites seem to be stereotyping blacks themselves, not just black neighborhoods. However, actual experience of greater integration by whites, either in their neighborhood or at work, is strongly and positively related to white preferences for neighborhood integration as measured in the MCSUI.
3) While all groups prefer to live in neighborhoods with significant proportions of residents that share their own race or ethnicity, their desire to be surrounded by "people like them" reaches its maximum when the "out-group" is black, something that mere ethnocentrism cannot explain. Ethnocentrism "plays *some* role in the shaping neighborhood racial composition preferences, but its role is always small and inconsistent" (Charles, 2005, p. 66, emphasis in the original). Moreover, there is "virtually no support for the ethnocentrism hypothesis among blacks," based on the MCSUI data which shows that blacks strongly

prefer living in a neighborhood that is shared roughly equally with whites. There is evidence of some types of ethnocentrism among whites, but when probed as to the reason, “the majority of whites articulated their objections to residential integration by invoking negative racial stereotypes” (Charles, 2005, p. 66).

4) The fact that racial stereotypes underlie neighborhood racial composition preferences points in the direction of the prejudice hypothesis, of which there are two variants. The first is simple prejudice against an out-group, where negative racial stereotypes fuel distaste for living in the same neighborhood. The second hypothesis relates racial prejudice to group position. That is, what gives prejudice its social power is its creation of group differentiation, and the greater the differentiation the in-group members have learned to expect, the greater the resistance to sharing neighborhoods. Charles sees this group variant of the prejudice hypothesis as the most consistent with her survey data for whites, while both hypotheses seem to be at work for the other groups in that each displays negative stereotypes about out-groups, but less so for whites than blacks. Blacks always appear at the bottom of the social hierarchy as the least preferred out-group: When asked to consider their preferences for a multi-ethnic neighborhood, one-fifth of whites, one-third of Hispanics, and 41 percent of Asians chose a neighborhood without any blacks.
5) Examining the correlation between neighborhood racial composition and specific negative racial stereotypes, perceived difference in socioeconomic

> status and own-group attachment, negative stereotypes were the strongest predictor of neighborhood composition for whites, with the other two factors being statistically insignificant. “When whites hold negative stereotypes, their preferences for integration with those groups decline significantly and preferences for same-race neighbors increase” (Charles, 2005, p. 70). While the influence of negative racial stereotypes was less powerful for non-whites, especially Hispanics and Asians, nonetheless, “These and other data clearly point to racial stereotypes as the race-related attitude or perception that is most influential in forming neighborhood racial composition preferences” (Charles, 2005, p. 72).

In conclusion, then, Charles finds substantial support for the third factor of Galster’s model—racial prejudice against blacks by whites—as a contributing factor in creating the concentration of blacks that produces the uneven geography of opportunity described by Briggs. Moreover, it is a specific kind of prejudice rooted in promoting group position, in this case, white social domination of other racial and ethnic groups. Hence, it is not mere prejudice, but prejudice with purpose—to maintain the existing social and power relationships. For whites, “Maintaining their advantages and privileges requires a certain amount of social distance from non-whites—particularly blacks and Hispanics, who occupy the lowest positions on the totem pole. More than token integration with these groups signals an unwelcome change in status relationships” (Charles, 2005, p. 73).

For minorities, however, the relationship between stereotypes, group position and neighborhood racial composition preferences is more complex. Minorities seek substantial integration with whites as this has been most associated with upward mobility, but see those neighborhoods with only token representations of minorities as a signal of hostility. This appears to be especially true of middle-class blacks, who "may be among the most suspicious of whites and the least interested in sharing neighborhoods with them. For this group, affordability is not nearly the obstacle that whites' racial prejudice is" (Charles, 2005, p. 74). The result is a self-reinforcing cycle where white hostility generates black hostility which generates further white hostility.

Hence, white prejudice and black response to it creates an urban dynamic where stably integrated neighborhoods are rare. As more than token numbers of minorities move into a neighborhood, whites move out in search of neighborhoods where they are again dominant. Consistent with Briggs, the result is an expanding urban area with an expanding "container" in the middle of it reserved primarily for the poor and minorities, a container that maintains a greater isolation from opportunities than those available to most whites.

But if white prejudice is the result of negative stereotypes, where do these come from, how are they reproduced and how can they be changed? Charles gives some clues when she suggests that the experience of integration is negatively related to stereotypical thinking. That is, stereotypes flourish in the absence of actual contact, but first-hand observation substitutes real experiences for hypothetical ones, diminishing—though not eliminating—their prejudicial influence on behavior.

Whatever the mechanisms by which negative stereotypes about blacks are created and reproduced, it is clear they are employed by whites to justify their control over social outcomes. The benefits from such control, in turn, then help explain *why*, if not *how*, such prejudicial attitudes are sustained and reproduced in succeeding generations. An adequate explanation of institutional racism must describe the relationships between power, attitudes, stereotypical thinking and desire for control over others that results in a social hierarchy of the sort uncovered by Charles.

Many mechanisms exist by which these power relationships have been and continue to be preserved in the housing market. (Pendall, 2005) reviews the history of how laws and regulations have been used in the past to promote housing segregation. Racial zoning—that is, explicitly creating ethnic enclaves—was applied early on, dating back to the 1870s in California with respect to Asian immigrants. In the early 1900s, the Supreme Court's decision in *Plessey vs. Ferguson* "allowed separate but equal" facilities to remain legal. Explicit black/white racial zoning followed, where owners were forbidden from selling property to anyone but those of the race allowed in their zone. Such zoning by local governments was subsequently declared unconstitutional in the Court's 1917 decision in *Buchanan vs. Warley*, but this just shifted the segregation efforts from the public to the private sector. Instead of zoning, private deed restrictions and covenants were employed by developers, landowners and homes associations to exclude people of a particular race, religion or ethnicity. These, too, were outlawed by the Supreme Court in 1948. Nonetheless they continued in use through the 1960s.

Efforts to segregate neighborhoods then shifted to more subtle means. FHA loans favored "stable" neighborhoods which the agency defined largely through the prevalence of whites, with the result that loans were hard to obtain in mixed-race neighborhoods. Of course, because minorities tend to have lower incomes and, especially, lower wealth, they have relatively more difficulty buying homes even without discriminatory home financing. Use of local land use regulations, then, to further increase the cost of housing had the effect of excluding many low-income minority households from the suburbs. Examples of policies adopted to create communities that cater to higher-income households include increasing minimum lot size requirements, separating land uses to create low-density communities that force dependence on the automobile, and limiting the amount of land zoned for multifamily housing.

Tegeler (2005) reports that even government housing programs designed to provide decent housing for the poor and disadvantaged largely provided shelter in a way that promoted segregationist tendencies. A 25-year building boom in public housing beginning mid-century produced virtually all of its low-income housing units in mostly black, high-poverty neighborhoods. With the passage of the 1968 Fair Housing Act and subsequent case of *Shannon v. HUD,* it was intended that this change, and it did for high-rise housing projects. But simultaneously, the nation's efforts at providing low-income housing shifted from such high-density projects to programs that were not as well regulated with respect to fair housing.

For example, the federal Low-Income Housing Tax Credit (LIHTC) program failed "to explicitly require compliance with fair housing policy… [and] led to a geographic distribution of LIHTC housing in many states that mirrors existing conditions of racial and economic segregation" (Tegeler, 2005, p. 202). The Community Reinvestment Act (CRA) rewards banks for financing low-income rental housing in already poor areas, exacerbating the concentrated poverty that already afflicts minorities, especially Hispanics and blacks. The HOPE VI public housing redevelopment program tore down many high-rise housing projects that created the highest concentrations of poverty, but did not insist on a one-for-one addition of low-income housing units. This diminished the need to build scattered site low-income housing in non-poor areas and, consequently, little such housing has been built. The Housing Opportunities Made Equal (HOME) program limited its application of fair housing standards to the construction of new rental housing, but the program funds little new construction. Even the Section 8 housing voucher program, which is designed to increase low-income housing choice and requires public housing agencies to adopt income deconcentration goals, only applies these goals to equalizing incomes among the facilities within each agency's geographic area. In fact, "no efforts are made in the regulations to bridge the demographic divide between urban and suburban agencies,"(Tegeler, 2005, p. 208) and so the poor remain concentrated in central cities.

In each case, the Fair Housing Act's mandates have been whittled away either explicitly or through lack of enforcement. According to Tegeler, this reflects, "a growing emphasis on community revitalization strategies (upgrading the places where

disadvantaged people are already living), as efforts to promote residential integration (changing where people can and do choose to live) have faced repeated and seemingly intractable obstacles" (Tegeler, 2005, p. 198). While Tegeler says that the two objectives are not inherently incompatible and should actually be complementary, Briggs might counter that the former strategy leaves the "container" intact while the latter threatens to break it open, so it is little wonder that residential integration has run into more obstacles.

Even when the law clearly prohibits discrimination based on race, professional practices can adapt to undo it. Turner and Ross (2005) examine the role of realtors in reproducing racially segregated neighborhoods. Using paired testing that was conducted in 2000, they find that roughly 20 percent of the time, whites were provided some assistance or information by real estate agents that was not offered to blacks or Hispanics. Hence, systemic discrimination against minorities still exists when buying or renting a home. In general, this discrimination is occurring at significantly lower rates than in 1989 (the last time such nationwide paired testing was conducted), so it appears that increased education and enforcement activities are having a positive impact. Despite this overall improvement, however, it is telling that one form of systemic discrimination against minorities is still increasing—geographic steering. That is:

> White and minority homebuyers may both be treated courteously, shown a wide variety of housing options and offered plenty of advice and encouragement. But if whites are systematically shown houses in more predominantly white neighborhoods, while minorities are steered to mixed or minority neighborhoods, they may never find out about opportunities for greater residential integration. (Turner & Ross, p. 94)

Thus, while overt discrimination is decreasing, the increase of a more subtle form of discrimination nonetheless is at work to maintain an effective residential "container" for minorities.

One issue with using a legal and regulatory approach to equalizing opportunity is the length of time it takes to change attitudes versus the length of time public policy remains consistent. In the case study of Minneapolis-St. Paul, Goetz, Chapple and Luckerman (2005) find that during the 1970s, the Twin Cities region was one of the most progressive metropolitan areas with respect to fair housing. In 1967, the state legislature had established the Metropolitan Council, a form of regional governance that had responsibility for establishing an urban growth boundary, directing infrastructure investments and otherwise shaping the region's growth patterns. By 1971, the Council began dispersing what they called "modest-cost" housing throughout the region, viewing fair housing as part of its mandate. Then, in 1976, the state legislature passed the Minnesota Land Use Planning Act (LUPA) which requires mandatory land use planning and that local governments absorb their fair share of the region's need for low-income housing. The Council used its federally granted power as a Metropolitan Planning Organization (MPO) to review federal applications for road and sewer funding to ensure that local plans set aside sufficient land for the high-density housing needed for units to be affordable. By 1983, the center city's share of subsidized housing fell from 82 percent to 59 percent, making it a national leader in fair housing achievements.

Yet, this effort was derailed so that by the late-1980s and 1990s, efforts to disperse low- and moderate-income housing became virtually non-existent. Three factors were primarily responsible. First, the election of Ronald Regan brought sweeping changes to federal social programs. In particular, the U.S. Department of Housing and Urban Development budget was slashed by 80 percent over six years, severely diminishing the level of subsidies available to local governments for building low- and moderate-income housing. Second, the state governorship also changed, first to a Democrat who was uninterested in urban affairs and then to a Republican whose base resided in the suburbs. This resulted in appointments to the Metropolitan Council who were less willing to interfere in suburban plans or hold them accountable for accepting their fair share of affordable housing. Finally, minority demographics changed significantly, doubling in size in the 1970s and again in the 1980s. More importantly, the income disparities between central city and suburbs grew so that by the end of the 1980s, Minneapolis-St. Paul's income disparity was ranked sixth among the 25 largest metropolitan areas in the U.S. and its percentage of poor blacks that lived in high poverty areas was ranked first. These disparities fueled increases in crime, drugs and gangs, and these social problems became more and more associated with neighborhoods of high minority concentration, and resistance from suburban communities to accepting residents from those areas grew.

Yet, one can also discern something more at work, as intimated when the authors say that the Metropolitan Council viewed providing "modest cost" housing as equivalent to providing subsidized housing and that as a result, when the federal subsidies when away,

so did the energy behind monitoring or enforcing local governments' compliance with LUPA. This means that suburbs absorbing their fair share of housing low-income residents never became a widely held *local* value and so simply a part of the way the housing market operates. It was something imposed from the outside by the powerful agency of the federal government. But when the force of that imposition waned, local agency reasserted itself resulting in a reversion to the old ways of housing market operation.

It is interesting that this change occurred just as the affordable housing market was close to achieving the construction of a majority of the affordable housing where the majority of people lived—in the suburbs. Such an achievement had the potential to significantly alter perceptions, and with them, entrenched social relationships. The voting majority reacted, however, placing into power leaders who were more opposed to government intervention into markets.

In each case above, the story is the same. Attempts to use formal institutions of law and government to create equal opportunity regardless of race or income continually conflict with the informal institutions embedded in existing social and power relationships that favor whites over all racial and ethnic groups. Consistently, and mostly successfully, the informal institutions resist change despite some initial progress. In fact, after sufficient time, political pendulums shift, and then the formal institutions are re-employed to re-codify the pre-existing power relationships.

Tilly, Moss, Kisrchenman and Kennelly (2001) document that employers as well as residents use space as a signal of an area's attractiveness, associating it with stereotypical

perceptions of race, class, and worker skills and attitudes. “However, within this mix, racial composition—in particular, the location of concentrated black populations—plays a prominent role in employers’ perceptions of different locations within their metropolitan area. In many employers’ minds, white areas are linked to positive workforce and location attributes; black and Latino areas are linked to negative ones” (Tilly, Moss, Kirschenman, & Kennelly, 2001, p. 306).

Such stereotypes are at least partly responsible for the outmigration of firms from inner city to the suburbs, a rate that is estimated at six times that from suburban areas to the inner city (Tilly, Moss, Kirschenman, & Kennelly, 2001, p. 327). This employer mobility worsens the spatial mismatch between black workers and jobs. As a result, Hertz, Tilly and Massagli (2001) conclude that simply strengthening anti-discrimination activities in the suburbs is unlikely to be effective in raising black employment because there simply aren’t very many blacks who apply for work in the suburbs.

In combination, stereotyped associations and firm migration help explain the gap in black/white employment probabilities. Hertz, Tilly and Massagli (2001) estimate that the probability of employment for a black man with a high school degree and 5 years of experience to be 0.83 while for a white man it is 0.89, a significant though not especially large difference. The effect is stronger, however, if they include involuntary *under*employment as a negative rather than positive employment result. This suggests that discrimination may now take place more subtly than it times past, affecting hours of work or occupational opportunities as much as employment per se.

Occupational opportunities, of course, depend upon education. Hertz, Tilly and Massagli (2001) find that, when they include all the controls in their model (which include taking account of parental education, family structure, work tasks and detailed occupations), education turns out to be much more important than race alone in determining hourly wage. The penalty for having a high school diploma vs. a college degree is 22 percent, while the penalty for being female relative to male is 10 percent and the penalty for being black vs. white is 5 percent. However, all these controls essentially represent an unpacking of the diminished capacities created when blacks live isolated in a "container" characterized by concentrated poverty. Education, parental education, family structure and occupational choice are all weaker in such locations. Hence these places may be the mechanism by which a significant amount of variation in the control variables is created and perpetuated. Because, as Briggs suggests, these geographic areas are the result of an implicit policy to contain poor minorities, this brings us back to residential segregation as an important variable in determining relative economic opportunity.

Briggs (2005b) sees the metropolitan efforts toward "smart growth" and "sustainability" as perhaps the best hopes for restoring social equity to the public agenda. Smart growth calls for higher density, mixed use development that is serviceable by transit, biking and walking, rather than the auto-dependent sprawl of traditional suburban development. Sustainability calls for a vibrant economy that nonetheless makes much wiser choices with respect to utilization of natural resources, especially carbon, while increasing social equity. Still Briggs suggests it is the social equity portion of this agenda

that will prove to be the real test of whether these efforts do, in fact, produce more sustainable development patterns. Without a more uniform geographic distribution of disadvantage, its concentration will always form a high (social) pressure area that blows development and investment away from it. As Pendall, Nelson, Dawkins and Knaap (2005) reveal, smart growth *may* produce greater integration, but it may also produce gentrification that simply shifts the location of white and black enclaves. The outcome depends, in large part, on whether social equity is an explicit goal of the policies and regulations that implement the smart growth agenda.

The promise of creating more integrated, mixed-income, mixed-race neighborhoods is great. Chetty, Hendren and Katz (2015), for example, analyzed data from the Moving to Opportunity experiment. This experiment randomly selected impoverished families, and offered them the chance to move to a lower-poverty neighborhoods through the use of housing vouchers. Children in those families who were young—under 13—did substantially better than the control group. Incomes were 31 percent higher in their mid-20s, they were more likely to attend college, and they were more likely to live in lower-poverty neighborhoods as adults and to refrain from having children out of wedlock. Similarly, Chetty and Hendren (2015) analyzed IRS data on geographic mobility and income and found that when children move to better neighborhoods, their incomes converge to those of long-time residents at a rate of about 3.5 percent per year of exposure. Thus, they attribute between 50 percent and 70 percent of the observed variation in intergenerational income mobility to the causal effects of place (Chetty & Hendren, 2015, p. 2).

In summary, we find that there are many informal institutions in the U.S. that, when combined, make existing social and power relationships strongly resistant to change, despite the significant changes in politics, economics and technology during the 20th Century. This is not to say social relationships have not changed at all—they clearly have—but at the very least, they always seem to stop short of fundamentally changing the "containment plus sprawl" strategy for building U.S. cities.

To replace this strategy, it appears we need to significantly alter our informal institutions. In part, this is difficult to do because, like the fish that is unaware of the water, they are so pervasive that we are also mostly unaware of them.

Briggs identifies several American values that both underlie the "uneven geography of opportunity" and serve to make it a relatively invisible social problem today. These include:

1) The attractiveness of a place can be best judged by the status of the people who live there.
2) Communities are defined by the homogeneity of race, class and home values.
3) Political decisions should be made at the lowest possible level of government.
4) Markets are capable of meeting all needs.
5) Income is determined by individual effort.

The most glaring omission in the above list is any mention of the blind spot Americans have with respect to continuing racial discrimination. Such discrimination is no longer explicit, in law or in most ordinary conversation. Stated as a value similar to Briggs,

Americans seem to believe that equal rights have been legally won, therefore equal opportunity exists. Consequences that fall more heavily on blacks—whether incarceration rates, media portrayals or just plain suspicion—are believed to be the result of character and culture alone.

Feagin (2013) would be unsurprised by this blind spot. He asserts that whites operate out of what he terms a "white racial frame" so prevalent it contaminates the thinking of even white sociologists studying race. By "white racial frame" he means not just prejudices, stereotypes and ideologies, which are well-studied by such academics, but also "an overarching white world view that encompasses *a broad and persistent set of racial …images, interpretations and narratives, emotions, and reactions to language accents, as well as racialized inclinations to discriminate*" (Feagin, 2013, p. 3, emphasis in the original).

This world view frames thinking so completely that it persists even when contradicted by clearly observable facts. Feagin cites the example of a white man approaching a group of black pilots in uniform, and asking one of them to call him a cab. When the pilot says the only thing he knows how to do is fly a plane, the white man says he understands, but nonetheless asks the pilot again to call him a cab in spite of the uniforms and being informed of his error (Feagin, 2013, Preface, p. x). In Feagin's view, the white racial frame is not merely one among many socio-cognitive frames people employ daily, it is the dominant frame that routinely defines "a way of being, a broad perspective on life, and one that provides the language and interpretations that help structure, normalize and make sense out of society" (p. 11). It has become "a major part of most whites' character

structure, a character structure habitually operated out of, with important individual variations, in everyday life" (p. 14).

Underlying the white racial frame are deep roots dating to pre-colonial times. Feagin describes a European concept of a "great chain of being" that creates a hierarchy of all living things (pp. 40-41). It places humans above the animals because of superior rationality, Christians above non-Christians, and Christian male Europeans above all other people. As a result, endemic to this frame is not only "other" inferiority where non-whites were regarded only a little more than animals, but a strong assertion of white virtue and white superiority.

Still, it was the European colonization of the Americas that sharpened these notions with respect to Africans and indigenous Americans, the former enslaved to work the land taken from the latter. Linking physical characteristics, such as skin color and facial features, to non-whites being uncivilized heathen savages less than fully human created the social distance required to justify the taking of life, liberty and land.

The resulting social hierarchy creates what Feagin terms "racial capital" (p. 28) Going beyond material and financial wealth, racial capital includes social status and the ability to access social networks. It generates symbolic capital—shared assumptions and understandings that smooth interactions and grant privileges between whites but don't extend to non-whites.

Such racial capital, in turn, helps produce the racial hierarchy described by Charles that persists to this day. Feagin calls this hierarchy "the heart of systemic racism" producing

> a racist relationship—at a lower level, the racially oppressed, and, at a much higher level, racial oppressors. These socially separated and alienated groups have different interests. The former seeks to overthrow the racial hierarchy, while the latter seeks to maintain it (Feagin, 2013, p. 29).

The deep roots of the white racial frame are revealed in its embedding in the nation's founding documents. The "blessings of liberty" to be secured for "We, the people" did not apply to slaves. Feagin documents seven sections of the Constitution that protected the institution of slavery, and argues that the U.S. would have experienced quite a different history without them—for example, Thomas Jefferson would not have been elected president and Missouri would not have entered the union as a slave state (p. 32).

Perhaps more importantly, the Constitution included several anti-democratic elements. The U.S. Senate, with equal rather than proportionate representation by state, gave Southern senators sufficient power to block both anti-slavery legislation before the Civil War and civil rights legislation after it. The Supreme Court, until recently the exclusive domain of relatively wealthy white male judges, often decided cases in ways that helped reproduce the white racial frame in succeeding generations. For example, the Dred Scott decision of 1857 ruled that blacks were inferior. Feagin quotes the Chief Justice as saying blacks had "no rights which the white man was bound to respect" (Feagin, 2013, p. 33). In addition, rulings in favor of "states rights" provided protection from federal intervention with respect to slavery before the Civil War and legal "Jim Crow" segregation following it

(p. 33). In 1896, the *Plessey v. Ferguson* decision upheld black-white segregation of public facilities (p. 84).

These anti-democratic elements helped ensure that those with power have influence over political decisions disproportionate to their numbers. In examining the impact of the nation's Founding Fathers, senators and justices, Feagin holds white elites especially accountable for the decisions that have created the institutional arrangements responsible for reproducing the white racial frame over the nearly four centuries since the introduction of slavery on this continent.

Such decisions continue to this day. In the aftermath of *Brown v. Topeka Board of Education* and the civil rights legislation of the 1960s, "white leaders…created weak enforcement mechanisms…[that] guarantee the continuation of the dominant racial hierarchy," (Feagin, 2013, p. 95) as documented by the experience of Minneapolis above. Federal and state legislatures' decisions regarding which crimes deserve prison and to remove judicial discretion, along with prosecutorial decisions concerning who to charge, have led to disproportionate incarceration of black males (p. 153). The decisions of local media executives concerning the coverage of violent crime describe black suspects disproportionately to their actual arrest rates, while white-collar crime is under-covered (p. 104). Discretion in health care decisions by medical professionals reveals a racial bias in treatment (p. 152).

Employers, too, show evidence of decisions influenced by the white racial frame. After sending out 5,000 resumes to 1,300 businesses, Bertrand and Mullainathan (2003),

found that it took average of 10 resumes to generate one callback if the name on the resume were a common white name, such as Emily or Greg, but it took an average of 15 resumes to generate one callback for common black names, such as Lakisha or Jamal. By also systematically varying other qualifications, they find a resume with a black-sounding name requires an additional eight years of experience to offset the advantage granted by a white-sounding name on the same resume.

Banks show evidence of operating under the white racial frame as well. Swarns (2015) describes banks in New York and Missouri continuing to engage in "red-lining," the practice of discriminating the offering of services to prospective borrowers based on the racial and ethnic characteristics of the neighborhoods in which they currently or wish to live. A bank executive is quoted as saying minority areas were "like a whole other world" as the justification for why more loans weren't made there, inferring that the rules for assessing the riskiness of borrowers in "ordinary" areas did not apply to this "other world."

Such overt expressions of the white racial frame are rare. Generally, they have become more subtle and covert in the aftermath of outlawing segregation. Feagin (2013) provided diaries to students to record incidents of racism and found that while racist remarks, jokes and stereotypes were typically suppressed "front stage" where there might be others listening, such references often flourished among whites in "backstage" settings when they felt safely alone with members of their own group (pp. 11-12, 122-129). Meanwhile, white virtue is promoted in movies, TV and video games, where "whites are regularly portrayed as noble, brave, and kind, and as natural born leaders…" (Feagin, 2013,

p. 129) A sizable number of portrayals go beyond this to show whites as the saviors of people of color, such as in the movies *Dances With Wolves* and *Avatar*.

Bobo, Charles, Krysan and Simmons (2009) reviewed nearly 40 years of the General Social Survey (GSS) and similarly found that white attitudes toward blacks had shifted from more overt to more covert forms of racial animus. While support for laws banning racial intermarriage or allowing whites to keep blacks out of their neighborhoods has consistently declined (p. 14), as have beliefs that blacks are lazier and less intelligent than whites, collective racial resentment of blacks by whites appears to have increased. Such resentments include "a sense of antagonism to political demands by blacks, rejection of the assumption that real discriminatory barriers impeded black advancement, and hostility to any favor or benefit blacks might now receive from government" (p. 29) In short, there is a strong feeling by whites that "other groups made it in America without special favors, and blacks should too" (p. 30). Most often, whites justify their economic advantage over blacks as a result of the latter's "lack of motivation or will." Bobo, Charles, Krysand and Simmons (2009) thus find that whites' negative perceptions of blacks appear "to have shifted away from presumed biological or natural differences toward presumptions rooted in group culture" (p. 41). Moreover, since black economic disadvantage is, in the view of whites, entirely the fault of blacks themselves, whites are able to maintain considerable social distance from blacks and deny full identification with them, reducing white feelings of compassion for or admiration of blacks.

With “Jim Crow” segregation outlawed and explicitly prejudicial views only expressed “backstage,” many whites have begun to assert that we live in a post-racial, colorblind society, further evidence of the power of the white racial frame to limit both what is perceived and the depth of white introspection. The solution, according to Feagin (2013), is aggressive counter-framing.

Most American’s believe that everyone has the right to “life, liberty, and the pursuit of happiness” as promised in the nation’s Declaration of Independence, and that its Constitution works to “ensure justice” and “secure the blessings of liberty” for “We, the people” (pp. 163-164). Feagin describes this as a “liberty-and-justice” frame that, historically, has been hypocritically applied only to whites. However, a more authentic liberty-and-justice counter-frame has been articulated by people of color, as well as some whites, that actively demonstrates where the dominant frame falls short of its own ideals of “liberty and justice for all,” as stated in the oft-recited “Pledge of Allegiance.” This counter-frame includes: “a strong analysis and critique of white oppression; an aggressive countering of anti-black framing; and a positive assertion of the humanity of all people and their right to real freedom and justice” (Feagin, 2013, p. 205).

The difficulty is in getting whites to perceive their current liberty-and-justice frame as inauthentic. According to Feagin (2013, pp. 204-211), this requires de-framing, i.e., “consciously taking apart and critically analyzing elements of the white racial frame… Entrenched frames tend to trump new facts,” however (pp. 204-205). As a result, while

facts are important, they must clearly contradict the dominant frame and cause deeper introspection and more thorough consideration of alternative points of view.

Even when armed with clear and thought-provoking facts, racialized emotions trump reasoning. Therefore, facts must be augmented with personal encounters between whites and people of color who have actually experienced the impact of institutionalized racism (p. 208). Further, both groups and individuals must engage in active dissent aimed at "reminding whites of their better values" and fostering "identification…with those being racialized and attacked" (Feagin, 2013, p. 215).

Fostering identification is the subject of research by Bryan, Adams and Monin (2015). They found that, when given a chance to anonymously cheat, admonitions to "Don't cheat" were not effective, but admonitions to "Don't be a cheater" were very effective. People who engage in dishonest or immoral behavior disassociate that from their identities so they can have their cake (benefit) and eat it too (still see themselves as honest). They hypothesize the latter phrasing links the immoral behavior with identity in a way that the former phrasing does not, increasing the psychological cost of that behavior. They cite similar findings by Bryan, Walton, Rogers & Dweck (2011) with respect to asking people how important it is "to vote" vs. "be a voter" the day before an election, the latter inducing more actual voting. Seemingly minor changes in language may may, therefore, help whites achieve increased identification with the experiences of blacks.

Increased identification allows increased engagement. Pentland (2014) argues that trust is built through engagement, the fullest form of which occurs when the people you

talk to also talk to each other. This allows heretofore separate social networks to spread and intersect. Pentland suggests that when ideas from different networks intersect, the possibility of social innovation arises.

Such innovation can appear suddenly once networks are more thoroughly connected. Centola and Baronchelli (2015) find that the more completely the network is connected, the quicker it evolves a new convention held by all. Randomly but incompletely connected networks are also capable of evolving such a convention, though it takes longer. The resulting selection is the result of what Centolla and Baronchelli call symmetry-breaking. However, the convention selected is randomly chosen among the available alternatives. How a minority might use this property to direct the selection of a convention by a minority is left for future research.

If the informal institutions of the white racial frame are behind the resilience of the "containment plus sprawl" strategy that produces an "uneven geography of opportunity," then any theory that proposes to provide some insight into fundamentally changing that geography must also provide insight in how to change these institutions, which implies describing how they arise and become prevalent in a society. We turn next to institutional economics to uncover its insights on such matters.

Original Institutional Economics

To explain institutional racism, we need a theory that allows for purpose, differential power and discrimination. To figure out how a small group of individuals might influence social change, such a theory must explain how individual agency and social structure can be mutually constitutive, where agents are influenced by, but can also influence, social rules. The inspiration for such an agent can be found, not in the utility- and/or profit-maximizing agent of neoclassical economics, but in the classical economic thought of Smith and in the Original Institutional Economics (OIE) of Veblen, Dewey, and Mead.

Veblen recognized that real human agents are active, purposeful. For example, Veblen (1898) writes,

> …it is the characteristic of man to do something, not simply to suffer pleasures and pains through the impact of suitable forces. He is not simply a bundle of desires that are to be saturated by being placed in the path of the forces of the environment, but rather a coherent structure of propensities and habits which seeks realisation and expression in an unfolding activity. … The economic life history of the individual is a cumulative process of adaptation of means to ends that cumulatively change as the process goes on, both the agent and his environment being at any point the outcome of the last process…. What remains as hard and fast residue is the fact of activity directed to an objective end (pp. 390-391).

These agents are inherently social. Indeed, the self itself is considered to be social. Mead (2006a, pp. 472-473), for example, argues that, “It is absurd to look at the mind simply from the standpoint of the individual human organism; for, although it has its focus there, it is essentially a social phenomenon.” This is because, “The processes of experience

which the human brain makes possible are made possible only for a group of interacting individuals: only for individual organisms which are members of a society; not for the individual organism in isolation from other individual organisms." As a result, "The self, as that which can be an object to itself, is essentially a social structure, and it arises in social experience."

Therefore, the self is emergent, constructed from contact with others. "Thus, the child can think about his conduct as good or bad only as he reacts to his own acts in the remembered words of his parents" (Mead, 2006b, p. 482).

Far from considering what was best for them alone, then, such social agents are imbued with moral sentiments. As described by Adam Smith (2006), chief among them is sympathy for their fellows, or what we might call empathy today. While Smith would allow that we care much more about our little finger than an earthquake in China, and that we empathize with the rich more than the poor, nonetheless, Smith thought that sympathy provided the basis for moral sentiments that could restrain the selfish acquisitiveness of unbridled capitalism. Pre-dating Mead, Smith argues that sympathy enables us to imagine our actions as they would be judged by others, and this is how we come to learn what is good and appropriate, and what is not. Society provides a mirror that, "in the countenance and behavior of those he lives with" an individual can see "the propriety and impropriety of his own passions, the beauty and deformity of his own mind" (Smith, 2006, p. 101).

Still, Smith worried that our selfish interests would win out in the end. To counteract them required sufficient capacity for sympathy to imagine our actions as they

would be viewed, not just by others, but by the best and wisest judge, what he termed the "impartial spectator." As Smith considered the implications of the assertion above, i.e., that most people care much more about losing their own little finger than the loss of millions of Chinese lives, he asks:

> To prevent, therefore, this paltry misfortune to himself, would a man of humanity be willing to sacrifice the lives of a hundred millions of his brethren, provided he had never seen them? Human nature startles at the horror at the thought…But what makes this difference?... It is not the soft power of humanity, it is not that feeble spark of benevolence which Nature has lighted up the human heart that is thus capable of counteracting the strongest impulses of self-love. It is a stronger power…It is reason, principle, conscience, the inhabitant of the breast, the man within, the great judge and arbiter of our conduct…. It is from him only that we learn the real littleness of ourselves…and the natural misrepresentations of self-love can be corrected only by the eye of this impartial spectator. It is he who shows us the propriety of generosity and the deformity of injustice… (Smith, 2006, pp. 106-107)

Thus, as summarized by Heilbroner (2006), we move from modes of behavior calculated to win the approval of others to more "idealized modes—the modes than an 'impartial' observer would find fitting. In this way…we progress from merely wishing to be praised to being *worthy* of praise…"(p. 59, emphasis in the original).

Veblen, however, saw a world where capitalism's acquisitive tendencies were, in fact, winning. He nonetheless theorized that human nature included instincts and proclivities that were both other-regarding and self-regarding. As described by McCormick (2006), the other-regarding instincts included the instincts of:

- "parental bent," by which Veblen meant all that propels us to leave the world better for future generations, not just mothers caring for their children,

- "idle curiosity," so that by engaging in exploration for its own sake, the knowledge of the community, and indeed all of humanity, is increased.
- "workmanship," the most important instinct for economics, as it is workmanship that spurs making increasingly productive and efficient means to meet ends.

These instincts were counterbalanced by self-regarding instincts, which included the instincts of:

- "self-preservation"—regarded as the strongest of the instincts
- "emulation," especially (echoing Smith), of those with greater status. In a modern capitalist (aka, "pecuniary") society, such emulation often gave rise to making "invidious distinctions" where some people, or some classes of people, are judged to be worth more than others. This justified the instinct of…
- "predation," the actual holding down or hurting of others in order to benefit oneself or one's social group.

To modern ears, calling these instincts seems a little "off," and Veblen himself was uncomfortable with the term but simply couldn't find a better word. Nonetheless, modern discoveries do, in fact, provide some biological basis for several of Veblenian instincts.

For example, the instinct of emulation is supported by the discovery of mirror neurons in the brains of primates that "hardwire" their brains to make emulation of others easier (Rizzolatti 2008). The parental bent instinct appears to be at least partly supported by the chemical oxcytocin, in which both mother and child are bathed in great quantities during childbirth. It has been found to promote strong feelings of empathy for others (Zak

2012). Interestingly, while oxytocin engenders increased empathy for those in one's own group, it also increases the propensity to treat those in an outgroup unfairly, perhaps simultaneously providing a biological basis for the instinct of predation as well as parental bent (Pfeiffer 2013).

In a similar fashion, the Yale Infant Cognition Center (Bloom 2010) finds that infants and toddlers are significantly more attracted to agents who are helpful than are hurtful, also supporting the idea of a natural propensity to empathize with others. At the same time, though, they desire to punish those whose preferences (even for simple food choices such cheerios or crackers) are different from their own, showing they are already capable of making "invidious distinctions" concerning who has greater worth and a willingness to support predation of those considered "other."

While these don't prove the existence of Veblenian instincts as Veblen conceived them, his primary assertion—that we are all heirs to a common human nature that contains sometimes conflicting propensities to act both in self-interest and in the community's interest—rings true.

While Veblen understood common instincts to motivate behavior, they did not determine it. How each individual expressed those instincts depended upon his or her habits. According to Dewey (1922/1988), "Repetition is in no sense the essence of habit. … The essence of habit is an acquired predisposition to *ways* or modes of response…" (p. 17, emphasis in the original). As such, habits are always active, even when they are not currently being employed. They stand ready to engage whenever the situation warrants.

It is at the level of habits that the individual and society were joined. Notably, as explained by Dewey (1922/1988), habits aren't simply given—agents are active participants in acquiring habits that favor their surviving and thriving. But neither are habits freely chosen, because they are acquired within a particular social and physical environment—"a society or some specific group of fellow-men is always an accessory before and after the fact" (p. 16). Far from being bad, most habits are constructive in that they allow us to navigate the world and satisfy our individual and social needs. As Dewey says, "The truth is in every waking moment, the complete balance of the organism and its environment is constantly interfered with and as constantly restored" (p. 125). Habits are what effect this constant restoration.

Dewey calls habits "arts," in the sense that they are the product of practice and adaptation to past experience, resulting in sufficient mastery to achieve ends we have in view. The best habits are intelligent rather than routine, infused with thought and feeling rather than mechanical behaviors, similar to the difference between an artist's work vs. a mere technician. When habits are intelligent, they become more rather than less flexible, more rather than less adjustable to new circumstances. As our habits combine and interact, the interpenetration of habits governs how we behave, what we perceive and how we think. According to Dewey, we are our habits; they define our character. As such, they are more fundamental to our selves than our conscious thoughts.

That agents are composed of learned habits and propelled by instincts to care for both themselves and others leads to complex agents involved in complex relationships with

others. In spite of that complexity, or perhaps because of it, the result is a community of agents who share certain ways of thinking and doing. Such "prevalent habits of thought" can be defined as institutions, according to Veblen (1899, p. 88), the development of such institutions being the development of society. The fact that individuals are born into a society and that individual habits are learned within the context of prevalent habits of thought make institutions dominant or coercive over the lives of individuals. As Dewey (1922/1988) says with respect to the institution of language,

> There is no miracle in the fact that if a child learns any language he learns the language that those about him speak and teach, especially since his ability to speak that language is a pre-condition of his entering into effective connection with them, making wants known and getting them satisfied (p. 43).

Habits, whether individual or collective in the form of institutions, represent adaptions to past conditions. "Habits become negative limits because they are first positive agencies" (Dewey, 1922/1988 p. 122). Therefore, in a constantly changing world, they may not represent the best adaptations to current conditions. Often this surfaces as a habit that is denied completion or a conflict between habits. The resulting frustration or conflict then "releases impulsive activities which in their manifestation require a modification of habit, of custom and convention" (Dewey, 1922/1988, p. 62). Such impulses are outbursts of emotional energy that make a reorganization of habit and custom possible. Indeed, because conflict between habits stops their completion, it is what makes real choice, conscious choice, free choice possible. As Dewey (1922/1988) remarks,

> Conflict is the gadfly of thought. It stirs us to observation and memory. It instigates invention. It shocks us out of sheep-like passivity, and sets us at noting and contriving…conflict is the sine qua non of reflection and ingenuity (p. 207).

But the thought required is of a special kind, according to Dewey—deliberation:

> …deliberation is a dramatic rehearsal (in imagination) of various competing possible lines of action. … an experiment in finding out what the various lines of possible action are really like. …Each conflicting habit and impulse takes its turn in projecting itself upon the screen of imagination. …In thought as well as in overt action, the objects experienced in following out a course of action attract, repel, satisfy, annoy, promote and retard. Thus deliberation proceeds. To say that at last it ceases is to say that choice, decision, takes place (pp. 132-134).

By considering all the possible lines of action and reaction, this allows the application of the necessary intelligence harmonize competing tendencies and reunify habits so they support the life of the community, and in this way, become moral.

It is not clear that such an introspective process can successfully effect social change, however. When systems are complex, people can't accurately predict more than a few steps ahead before unanticipated reactions and feedback overwhelm our limited cognitive capacity (Senge 1990, p. 365). Moreover, there is still a question as to how the reunified habits resulting from such a deliberative process spread to the larger society. While Dewey admitted conflict at the level of habit, he presents the conflict as happening mostly within the individual. While the deliberative process is social, as are all processes of inquiry, that process is presented as occurring consensually so that once a solution is achieved, it is immediately shared by all. In large part, this is because Dewey's model of social change is principally to encourage individuals to learn more intelligent and flexible habits, habits that can be more easily adjusted when it is clear they are no longer well-adapted to the present situation. "Not convention but stupid and rigid convention is the

foe" (Dewey, 1922/1988, p. 115). Thus, for Dewey, the most important habit was the habit of learning, for this is what allows habits to become more intelligent over time.

This is not to say that Dewey didn't see conflict arising at the level of institutions, but to a large degree such conflicts were triggered by impersonal forces, perhaps making them more amenable to intelligent adjustment.

> War, commerce, travel, communication, contact with the thoughts and desires of other classes, new inventions in productive industry, disturb the settled distribution of customs (pp. 58-59).
>
> The significant point is …whether intelligent direction may modulate the harshness of conflict, and turn the elements of disintegration into a constructive synthesis (p. 90).

Veblen, on the other hand, saw conflicts being created by agents with purpose. As a result, what might be good for the life process of the community could be actively opposed by the wealthy. Their resources mean they are sheltered from changes in the current environment that others experience. Hence, their habits need not adapt. "The members of the wealthy class do not yield to the demand for innovation as readily as other men because they are not constrained to do so" (Veblen, 1899, p. 92). Moreover, members of this class have the ability to restrict the resources available to the lower classes and so "make them incapable of the effort required for the learning and adoption of new habits of thought" necessary to demand progress (p. 94). As a result, Veblen views what he calls "the propertied class" as being "of a parasitic character, and their interest is to divert what substance they may to their own use, and to retain whatever is under their hand" (p. 96). In this way, while the wealthy were not immune from the immense forces of economic change brought by the Industrial Revolution and Machine Age that he was considering—

factories, electricity, automobiles—they could nonetheless turn these changes to their own account.

Veblen was clear that institutions must change as conditions change, and that they change through an evolutionary process that, in part, employed individuals as a source of variation upon which natural selection could operate. But principally, he viewed the evolution of institutions being carried out at the level of institutions and was never very clear about how this might come about.

Foster (1981), however, more fully follows Dewey's conception that institutional change is initiated by individuals who, themselves, are members of the institution. Foster asserts that "solving [social] problems requires choosing rationally among alternatives" (p. 929), which implies there are conscious choosers playing a principal role, not simply impersonal forces of evolution and change. For Foster, rational choice means much more than maximizing individual self-interest, the standard in neoclassical economics. Rather, rational alternatives are those that "actually resolve the problematic situation" (p. 929). Such a resolution results in an improvement in "instrumental efficiency," defined as making a contribution to "the fullness and the continuity of the social process" (p. 930). Thus, for Foster, a rational choice is one that is consistent with the social, not individual, interest.

As "answers to social problems necessarily take the form of institutional adjustments" (p. 931), Foster proposes three general principles for such adjustments. The first, "technological determination," echoes Veblen that the institutions of today are the result of successful adaptations to the conditions of yesterday. However, the advance of

human know-how—technology—advances faster than our habits can change. As a result, more becomes possible than our current institutions allow, and this is the source of most social problems, according to Foster. Consequently, social problems can only be solved by adjusting institutions until they are better synchronized with the state of human knowledge, what Foster calls bringing them into an "instrumentally efficient correlation" (p. 932).

The second principle, "recognized interdependence," suggests that institutional adjustment is hard because it conflicts with the existing habitual behavior of the members of the institution. To depart from these habits,

> …requires a deliberate choice be made among the possible alternatives recognized by those who must alter their behavior. A new pattern of behavior requires that the behavior be "directed" in its initiation. It becomes habitual through repetition, but its initial performance requires conscious direction. … [A]ll adjustments, and therefore the whole of institutional structure, are specified at initiation…Patterns of human relationship that we call institutions are "made up of" habitual actions and attitudes, but they are not determined by habit. Their determination is a matter of deliberate and guided action. The habituation follows; it does not precede (p. 933).

What is most remarkable here is Foster's belief in the power of deliberate choice to change institutional structure—the whole of institutional structure is determined by such a choice.

The third principle of institutional adjustment is that of "minimal dislocation." Institutions can only change so far so fast. For an adjustment to survive, it must be incorporated into the pre-existing institutions while at the same time, improving instrumental efficiency. More importantly, potential adjustments must be comprehended

by those involved as solving a problem while, at the same time, “not do violence to the factors not considered problematic” (p. 934).

Foster summarizes his principles as follows: The first principle discloses the gap between “what is” and “what should be” to identify potential courses of adjustment. The second principle then discloses what should be done from the point of view of the persons involved, as well as the probability of such a choice being made. The third principle defines what can be done.

It is the second principle that seems, at best, incomplete. Even Dewey did not put this much faith in deliberate choice. While intelligent deliberation may illuminate a better path, Dewey felt that changing habits require much more than simply deciding to do something different. It required changing objective conditions and creating a whole new set of capacities that, through their exercise, would change habitual modes of thinking of and acting (1922/1988, pp. 23-29). Foster’s principles do not adequately address how to change objective conditions, determine which capacities need improving and garner the resources necessary to do so.

Equally important, the second principle glosses over the fact that the “persons involved” might be on opposite ends of the situation and so have conflicting points of view, conflicting perceptions of the problem to be solved or even whether there is a problem to be solved. It is not at all clear how conflicts over what “should be done” are resolved in Foster’s schema.

In general, there is not enough in OIE to figure out how to purposefully direct institutional change in a socially desirable direction—a moral direction, to use Dewey's term. In the OIE tradition, technology is seen as the most powerful force for institutional evolution; yet, the past century has seen unprecedented technical change without changing the fact of institutional racism. In fact, widespread adoption of automotive technology has been the chief instrument of the sprawl component of the "containment plus sprawl" institution. Social changes, such as the civil rights movement and the its accompanying anti-discrimination laws governing housing and hiring have also been shown to be insufficient to eliminate institutional racism, as underlying "habits of thought" reassert themselves after a time.

Dewey predicted as much:

> A social revolution may effect abrupt and deep alterations in external customs, in legal and political institutions. But the habits that are behind these institutions and that have, willy nilly, been shaped by objective conditions, the habits of thought and feeling, are not so easily modified (1922/1988, p. 77).

If the social and technological changes thus far have been insufficient to substantially reduce the incidence of institutional racism, then what else is needed? What are the evolutionary paths that would eliminate it, and how can society be moved onto them?

It is asserted here that progress can be made by augmenting OIE with a theory that offers a fuller explanation how "prevalent habits of thought" become both habits and prevalent. A key turns out to be updating OIE's theory of individual psychology and then showing how this updated theory can be extended into the social realm to more fully

explain institution formation and change. That updated psychology, Perceptual Control Theory is described in the next section.

Perceptual Control Theory

PCT Basics

Perceptual Control Theory (PCT) was developed by William Powers, and his 1973 book, *Behavior: The Control of Perception,* is still considered to be the most complete explanation of it. PCT is based around the idea that all living things have purposes,[1] such as self-preservation, and have learned over time how to control their interactions with their environment to achieve them. If they do not, they die. Even lowly bacteria sense food gradients and know to swim toward higher concentrations in order to obtain sufficient energy to reproduce.

The hallmark of these interactions is the negative feedback loop. Such loops act to maintain some reference condition. For example, my blood sugar drops and I feel hungry. I eat until I am no longer hungry, and my blood sugar rises and then stabilizes at its "normal" value. Similarly, homeostasis maintains normal body temperature by causing sweating when I am hot and shivering when I am cold.

Figure 1, reproduced from Powers , Abbot, Carey, Goldstein, Mansel, Marken, Nevin, Roberston and Taylor (2011), describes the basic structure of a control system more formally:

[1] This is in contradistinction to Dewey (1922/1988), who argues that only people are capable of having motives.

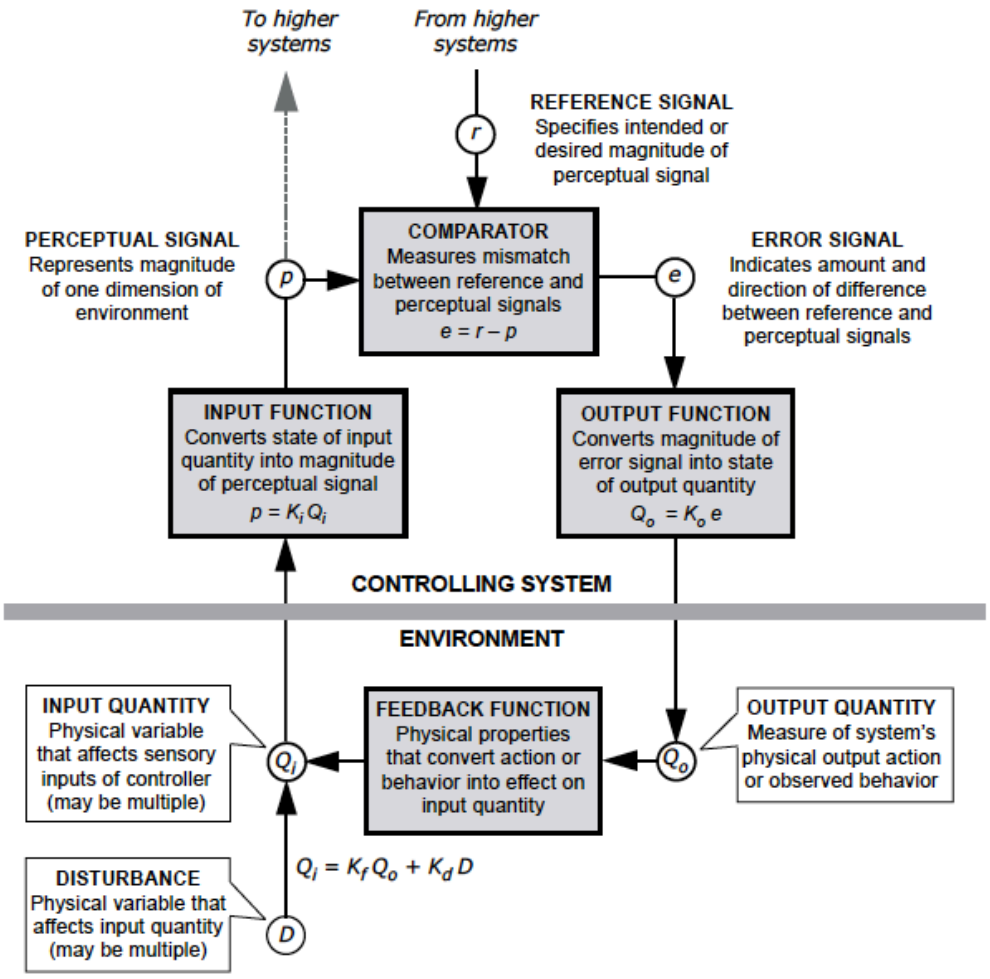

Figure 1: The basic organization of a negative feedback control system. Loop functions are shown in gray. Variables D, Q_i, *etc. are employed in the fundamental algebraic equations of negative feedback control theory, as described in the text. The reader is invited to explore the functions and relationships interactively in the Live Block demo (one of the LCS3Programs set—see the Resources section below).*

Figure 1. A basic perceptual control system unit. Figure and caption reproduced from Powers, et al. (2011), with permission from Benchmark Publications Inc, all rights reserved, Bloomfield New Jersey 07003. The reference to "LCS3 Programs" in the caption are those provided on the CD that accompanies Powers (2008).

In this diagram, the external environment is perceived via a perceptual input function (e.g. that car ahead of me is getting closer). This perception generates a signal that is compared to a reference signal retrieved from memory (this is how a car looks when I am following at a safe distance). If there is an error signal generated (that car is too close), an output function translates this into actions (quit pressing the foot on gas and start pressing the foot on brake) that produce an effect on the external environment (the car slows down). This feedback from the external environment is then perceived by the input function, which again generates a signal that can be compared to the reference. This continues until the perception is close enough to the reference that no error is generated. Without an error signal, the output function to slow the car ceases, but the loop is still switched to the "on" position. That is, even in conditions that satisfy the reference, the control system continues to perceive the environment and measure those perceptions against the stored reference. If the error reoccurs, the output function resumes.

Mathematically, a simple control system can be represented by the following system of linear equations, as described in Powers, et al. (2011):

(1) $p = K_i Q_i$ — input function

(2) $e = r - p$ — comparator

(3) $Q_o = K_o e$ — output function

(4) $Q_i = K_f Q_o + K_d D$ — feedback and disturbance functions

where p = perceptual signal, r = reference signal, e = error signal, Q_i = input quantity, Q_o = output quantity, D = disturbance, and K in each case (K_i , K_o , K_f , K_d) is a

constant converting amount of input to amount of output at each of the indicated points in the loop.

According to PCT, all behavior can be understood in terms of such control systems. We have references. Some of these are given (Powers calls them "intrinsic", though "essential" and "critical" are also sometimes used), especially those that relate directly to the organism's survival. But most are learned over time and even the intrinsic references are not completely fixed and unchanging (e.g., there is likely an intrinsic reference for hunger but the level of hunger that triggers an error is, to some extent, learned). Behavior is what we do, an output, but it is not what we aim to control. Rather, we alter our behavior in an attempt to control the world to accomplish our purposes/satisfy our references. However, we don't have unmediated access to the real world; all we know are our perceptions of it.[2] Hence, behavior is simply a byproduct of controlling our perceptions to match our references. While we think of ourselves as controlling outputs—i.e., actions—PCT has demonstrated using both computer simulations (Powers, 2008) and repeated experiments on individuals (see for example, the rubber band experiment described in Powers, 2005, pp. 243-45) that we, in fact, control our inputs—i.e., our perceptions.

Behavior is thus flexible while the purpose of that behavior is more stable. Behavior *must* be flexible because the world is a dynamic place and different conditions require different actions to maintain perceptions near references. In the case of hunger, I seek

[2] Note that this is consistent with the modest realism of classical pragmatists such as Peirce and Dewey, described in Webb (2007) as "small 'r' realism." In the hunger example above, I don't have access to the real-world trigger of hunger, i.e., changes in blood sugar. I am only able to perceive an uncomfortable sensation in my belly that I have found through experience the act of eating relieves.

food. But how I do it depends on a variety of factors, including where I am when I recognize that I am hungry, how strong the sensation of hunger is, where food is, what food choices are available, how much energy I have, modes of transportation available, the availability of a kitchen, etc. If one of these things changes, my behavior changes, but I still manage to find a way to eat. I still find a way to restore my perception of hunger to its reference level (i.e., zero, which means I am not hungry).

Seen from this perspective, much of economics can be understood as simply behavior undertaken to control the amount of food on the table (and meet other basic material needs for water, clothing, shelter).

According to PCT, control systems in human agents are functionally arranged in a hierarchy. The levels of this hierarchy are not set in stone, more illustrative than definitive, but they provide a framework for understanding how higher-level perceptions are constructed from lower-level ones, yet allow for multiple levels to be experienced at once. The latest version of these levels (Powers, 2008) are as follows:

1. Intensities—These are the results of stimulated nerve endings. What is perceived is only the quantity of stimulation, not the quality of it. Intensities are the representation we perceive of how much or little light, sound, pressure, smell, etc. we are experiencing.
2. Sensations—At this level, the vector of intensities is transformed into varying qualities of perception. For example, the vector of stimulation to the cones of the eye transform light and dark into edges, the vector of stimulation to the rods of the

eye is transformed into colors. In the same way, the vector of aural intensities are transformed into tone, pitch, and timber, while the vector of taste intensities is transformed into sweet, sour, etc.

3. Objects/configurations—The vector of sensations is organized at this level into stable, recognizable groups.
4. Transitions—How we experience small changes in our perception of objects as motion (as in frames of a movie) or movement from one state to another (as from colder to warmer)
5. Events—Similar to objects in that there is stable configuration of a single thing, but an event includes the element of time in addition to space. The amount of time is sufficiently short so that the perception is still of a single thing at a single moment, like the speaking of a word, the bounce of a ball, the opening of a door.
6. Relationships—The perception of how multiple single things, whether objects or events, compare to each other, particularly when the relationship is stable. For example, this is a part of that, or bigger than that, or when this goes up, that goes down.
7. Categories—The perceptions of things with stable relationships as being part of a stable group of objects or events. Such categories can then symbolize, stand for, whole groups of perceptions that up to this level have been individual and unique.

8. Sequences—Essentially an extension of events and relationships, this is the perception of the order of perceptions and that the order in which things are perceived can matter.
9. Programs—This is the perception of a sequence of sequences needed to accomplish a given purpose. Logic appears at this level because the sequence of sequences may vary with variation in the external environment, requiring tests at decision-points along the way.
10. Principles—These provide the objectives of the programs, and determine what decisions are to be made and how the tests should be evaluated. In fact, which program to run and how it is run is selected to support perceived principles.
11. System concepts—This is the perception of a group of principles as a coherent whole, a world view. Principles are selected in support of this world view.

Each level has its own perceptual function. At the lowest level are senses that interact with the real world. These are, in some way, aggregated to produce intensities. Intensities are, in some way, aggregated to produce sensations, which are aggregated in some way to produce configurations, which are aggregated in some way to produce transitions or motions, etc. The key phrase is “in some way.” Powers admits that exactly how the brain creates perceptions from combining things like wavelengths of light and sound with its own outputs is, at this point in our understanding, “magic.” Current models based on PCT therefore use highly simplified perceptual functions, though more advanced

models of perception can be incorporated into PCT as they are developed by neuroscientists.

Some of the secrets behind the "magic" of perception may, indeed, be in the process of being revealed. For example, the more advanced computer models of visual perception currently being developed for image and face recognition, in fact, employ simulated neural networks where higher-level perceptions are constructed from lower level perceptions arranged in a hierarchy. Lee, Grosse, Ranganath, and Ng (2009) develop a convolutional deep belief network that, shown nothing but unsupervised images drawn from the Internet, first combines pixel intensities to learn edges, then combines edges to detect feature parts (such as the left eye, right eyebrow, nose or mouth of a face), and finally combines feature parts to perceive whole features, whether they be faces, cars or elephants. While such detection and recognition stops at the level of configurations in Powers' hierarchy, Lee, Gross Ranganath and Ng provide a proof of Powers' concept, developed four decades earlier, that very low-level perceptions arranged properly in a hierarchy can produce the kinds of higher-level perceptions that humans most often consciously and effortlessly perceive.

These perceptions provide the basis for forming references. Each control system has a reference. Except for those that are intrinsic, all references are learned through interactions with the physical and social environment. While not all perceptions are controlled, a huge number are—the phonemes of language, the smells of foods, the sound of voices—anything that if, upon experiencing an unusual variation of it, causes a feeling

that something's not quite right. That feeling implies a reference had been previously created and with it an accompanying control system.

A reference is simply a stored perception. What is stored as a reference, though, is itself the product of a process of learning what is essential about a sensation, object, event, sequence or concept. For most references, this boils down to discovering what is invariant upon repeated experiences. This, too, is consonant with current neuroscience as perception itself is a product of "Fire together, wire together. Out of sync, lose your link," according to Carla Schatz, Director of Stanford Bio-X, a multi-disciplinary research lab (Adams 2014). However, explicit teaching of one person by another may be used to speed the learning of references. Such teaching may, in fact, be necessary for learning references at the highest levels of the hierarchy. Yet, that the lessons of experience often seem deeper, more fundamental and longer lasting than those learned through instruction alone indicate the power that perceptions learned over a long period of time hold over rational thought.

Even after learning, it is important to realize that references aren't fixed over time. This is because, except for the lowest level of the hierarchy (which generally affect the muscular tensions necessary to change something in the environment), the output functions of higher-level control systems primarily work to adjust the references for lower levels.[3]

[3] Presumably, output functions might also affect parameters of a lower-level perceptual input function to adjust the aspects of the environment to which it is most sensitive, or change the gain of a lower level control system so as to increase or decrease the tolerance

For example, it is at the configuration level that I have learned what constitutes a safe distance to follow a car, given my vehicle's current rate of speed. If that distance shortens and I recognize I am now too close to the car in front of me, the output from that level directs a change in the reference at the sensation level to change the angle of my foot and at intensity level to produce a reduced pressure of my foot on the gas pedal. The output from that level then creates muscle tension that causes the front of my foot to lift up. The environment changes by the accelerator pedal moving up and the car slowing. This is perceived at the configuration level as the distance increasing between the car ahead and me. This continues until I perceive the car is now again at a safe distance and the error between perception and reference goes to zero. At this point, the higher level loop that is directing where we are trying to go (the sequence level directing me to work, for example) takes over and adjusts the appropriate references in reverse to stop the slowing of the vehicle and instead resume a pace that matches the cars around me.

The beauty of this system is that *higher level systems don't tell the lower ones what to do, but what to perceive.* The lower level systems then act in whatever ways are necessary the produce those perceptions, given the conditions of the environment at that time (Powers, 1998-2010 pp. 38-40). As Powers says, "*all* behavior consists of reproducing past perceptions" (Powers, 1973/2005, p. 219, emphasis in the original).

If output from higher level loops largely works to control the references for lower level loops, what then controls the references for the highest levels of the hierarchy? Here

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of error in that system. PCT models that use these additional avenues of output control are rare in the literature, however.

Powers provides a very Veblenian answer. The choice of system concepts is at least partially driven by instincts (Powers, 1973/2005, p. 174)! Far from being lower-level or base instincts, the instincts Powers has in mind operate at the highest levels, including the instinct to be connected to others and part of a group. The parallel to Veblen's instincts of parental bent and emulation is readily apparent.

For Powers, social structures, such as society and culture, aren't in the physical reality of human existence, but in the psychological reality produced by perceptions of configurations (groups), relationships and system concepts. Yet this does not make society and culture any less real. ALL we know, ALL that is real for humans, is perception. This includes our "knowledge" of physical concepts such as mass, energy and force. We can't stand outside our brains to find a truer, objective reality. The search for references is, in essence, the search for warranted knowledge—that which is invariant under a wide range (though perhaps not all) conditions.

Powers also acknowledges that concepts may also be driven by memory—that is, by what concepts have been most often encountered (Powers, 1973/2005, p. 175). But the content and frequency of such encounters are determined by the group or groups of which one is a part, i.e., by the larger society. So, at the highest levels, this model of what goes inside an individual's brain opens up to being driven by a combination of instincts and experienced social interactions.

It is of these higher levels that Peirce and Dewey wrote most. As described by Webb (2007), Peirce and Dewey were concerned with the basis for knowing which concepts were

warranted and thought this could be decided by taking an experimentalist approach to inquiry. The inquiry process begins with an irritating, disturbed or otherwise uncomfortable (Dewey's word is "indeterminate") situation—an error, in PCT terms. This is felt as an existential imbalance akin to hunger. Such an imbalance initiates a search for a solution that brings the discomfort to an end, that is, where what is discovered during the inquiry process is re-integrated with what was known before so that the situation again becomes determinate. From a PCT perspective, then, the whole inquiry process is one of using intelligence to reorganize a control system, a process that ends when the error is eliminated and the reference for experiencing a determinate situation is re-achieved.

Because higher levels work through lower levels, it must mean that references at higher levels are more stable than references at lower levels. Hence we are more likely to be aware of, conscious of, higher-level references. Equivalently, for the hierarchy itself to be stable, control systems at higher levels must operate at a slower speed than those at lower levels. Indeed, Powers says that lower levels must complete their response to a disturbance before higher levels even begin (Powers, 1973/2005, p. 247). Errors are sensed and handled at lower levels possible so quickly they aren't even noticed by the higher-level systems.[4] Errors are only sensed by higher-level systems if they aren't resolved at a lower level.

[4] Note that this is very similar in concept to Kahneman's (2011) System 1 (lower level, fast) and System 2 (higher level, slow), though with the finer gradation offered by a system in 11 levels rather than two. Higher levels don't even perceive the errors that lower levels do, which prevents higher level manipulation of lower level references from causing violent oscillations as they react too slowly to conditions that have since changed.

Sometimes error is not well-controlled, however. This might arise when something novel occurs and our control systems are not well adapted to it. As Dewey might say, the novel element prevents the successful completion of prior established habits. For Dewey, this thwarting of habit produces an impulsive energy to do something to fix the situation. Similarly for Powers, a control system error gives rise to a feeling that something is wrong, which in turn produces an emotion such as anger or fear or sadness. If the error is in something important to the agent—a large and persistent error in an intrinsic variable—control systems undergo what Powers terms "reorganization."

In essence, reorganization is how control systems learn. It is learning at its most fundamental, at the level of the "wiring" or "programming" of the system, changing what functions it can perform. "It changes the parameters of behavior, not the content …permitting accomplishing old ends in new ways and accomplishing new ends that were formerly impossible" (Powers, 2005/1973, p. 181).

Reorganization is conducted using an evolutionary process by which the parameters of a control system are changed randomly until a change is found that successfully reduces error. Such a successful change also defines a direction of change from the prior values. That direction of change in the parameters is then maintained, not their specific levels. The parameters continue to change in the beneficial direction until the error once again grows worse, in which case the control system initiates a new random search until another direction is found that reduces the error. Powers calls this process "*E. coli* reorganization", after the process by which the bacteria swims up a food gradient until the gradient

declines, then repeatedly tumbles to swim in random directions until it finds another one where the food gradient is again rising. When error is driven back down to tolerably low levels, reorganization stops and control systems are maintained in their current state from that point forward—unless something else again creates large intrinsic error.

For simplicity, Powers models the reorganization system as one that sits off to the side, independent of the learned hierarchy of control systems that govern how organisms perceive and interact with the world. The reorganization system only monitors intrinsic variables and sends random variation into the learned hierarchy. This is because the reorganizing system must be able to operate before the hierarchy itself has learned to perceive anything more than sensations, as the reorganization system governs the organism's construction of the hierarchy itself (Powers, 2005/1973, p. 185).

As such, the reorganization system is inherited rather than learned, as are the intrinsic references it monitors. Powers acknowledges that modeling the reorganization system as separate from the learned hierarchy is only a simplification, and that it may, in fact, be in aspects of every level of the hierarchy being organized (p. 184). It is worth considering that because the reorganization system and the intrinsic variables it maintains are both inherited, one place where the reorganization system may particularly reside is in the unspecified levels of the hierarchy above system concepts where instincts also reside and are presumably related to intrinsic references. Such a high level is consistent with Powers characterization of the reorganization system as "the most generalized control

system so far considered" and, as such, "will also operate on the slowest time of all" (Powers, 2005/1973, p. 185).

Through the operation of the reorganization system, control systems evolve how they interact with the environment over time. They adapt to the environment at the level of parameters to become more efficient and effective at varying behavior to keep critical perception under control—i.e., near intrinsic references despite operating in a changing the environment.

In a remarkable demonstration of reorganization's ability to coordinate across control systems (Powers, 2008), Powers simulates an arm with 14 joints by linking 14 separate control systems, each with its own reference. If they all achieve their reference, the result will be a smooth arm motion. But their output functions begin with random parameters. As a result, when the simulation begins, the joints produce uncoordinated arm movement that inhibits each joint's ability to achieve its references. Yet, as they reorganize by varying their parameters in the face of the disturbances caused by the other joints, the joint movements gradually orthoganalize into 14 separate and non-interfering dimensions. They learn how to achieve their reference without hurting the other joint's ability to achieve theirs, allowing each control system maximum autonomy to achieve its individual purpose while still resulting in coordinated movement of the whole arm.

While reorganization is an evolutionary process, it is capable of much more rapid change than a purely Darwinian processes utilizing only random variation and selective retention at the time of organism reproduction. While random variation is used to provide

information to the organism concerning a beneficial direction of change, the amount of movement in that direction is under the purposeful control of the agent. Moreover, not only does change repeatedly occur in that direction so long as it reduces the agent's perception of error, such a reorganization can occur multiple times in an agent's lifetime. Therefore, it is a model more consistent with the relative rapidity of personal and social evolution than the mere reproductive fitness associated with natural selection.

It is not clear exactly what the parameters of a hierarchy of perceptual control systems might be. At the very least, control system parameters must govern what we pick out as important to notice when we perceive a situation (the input function in the control system diagram above). In this way, PCT is in line with Dewey's view that sense data are not given, but taken by the agent. As noted in by Webb (2007), "observation is mediated by limited sense organs, habits, intellectual constructs, perspectives and purposes of observation." Similarly, control system parameters must also govern what are the kinds of actions we think are important to attempt to reduce error (the output function in the same diagram).

Control system parameters also an operate at a more fundamental level of determining how tolerant we are of error in the first place (which is defined as the "gain" of a control loop) and which control systems should be engaged in resolving it, or for that matter, whether a new control system needs to be created or an existing one destroyed, though creation seems to happen much more often than destruction.

Intriguingly, some of this re-parameterization may be done in what Powers describes as the “imagination mode” of the hierarchy of perceptual control systems. While he refers specifically to improvements to control that take places in those imaginings we call “dreams” (Powers, 1973/2005, p. 197), the principle would seem to hold for other imaginings we call “plans.”

As described by Powers (1973/2005, pp. 207-228) that references are stored perceptions means that every level of the hierarchy has its own memory. This implies that perceptions do not have to only be experienced in “real time.” They can be recalled. Powers hypothesizes that when this occurs at one level in the hierarchy, current perceptions from lower levels are essentially switched off and the recalled perception is substituted. Simply recalling a perception does not typically result in action though. From this, Powers reasons that using memory as a reference to call forth behavior to correct perceived error can also be switched off. (Figure 2)

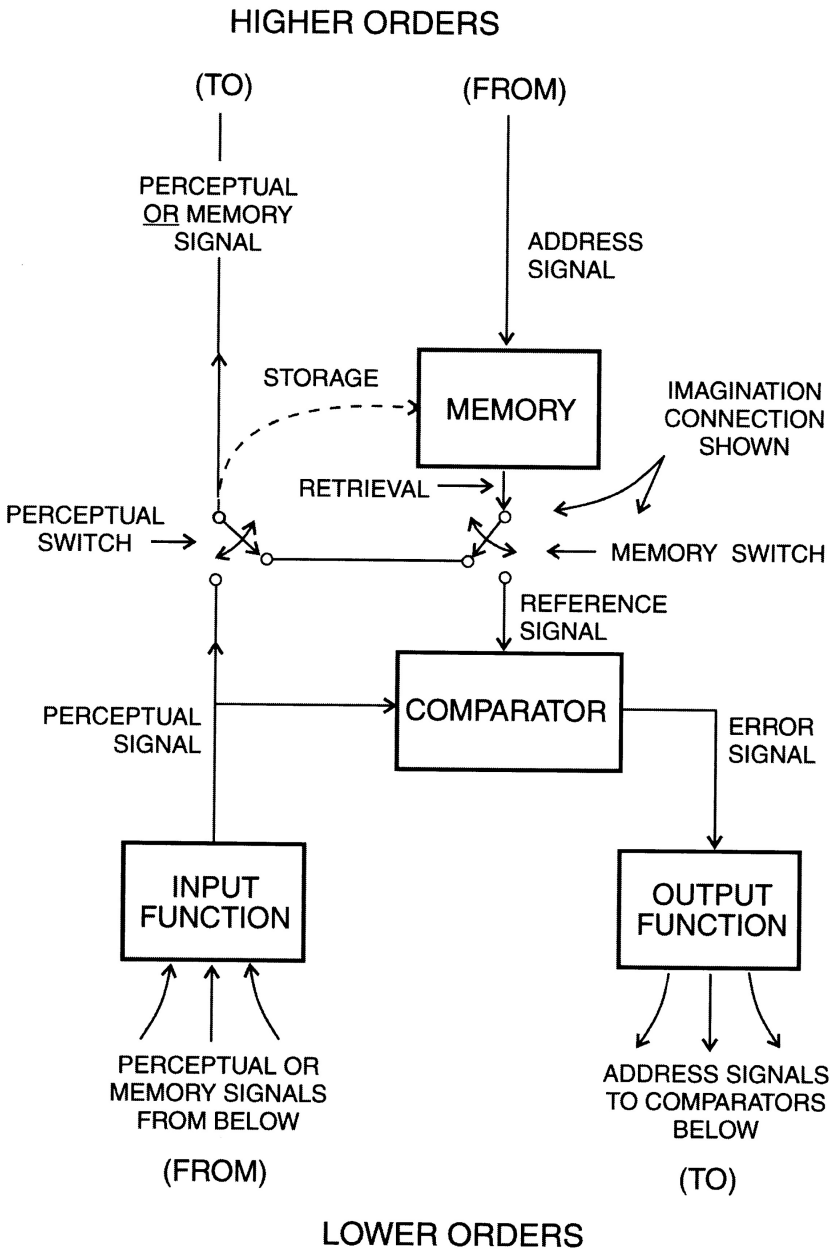

Figure 15.3. Final form of the unit of behavioral organization

Figure 2. Single perceptual control unit with memory showing the imagination connection. Figure and caption reproduced from Powers (1973/2005, p. 223), with permission from Benchmark Publications Inc., all rights reserved, Bloomfield New Jersey 07003.

These two switches then provide the possibility for four modes of control system operation. The first, when both switches are turned on (i.e., in the closed or vertical position in the diagram), this is the normal control mode—perceptions are either immediately compared against a reference that had previously been stored, or sent to a higher level in the hierarchy for additional processing and comparison. A passive learning mode occurs when the perceptual switch is set to "on" but the memory switch is turned to "off." In this mode, perceptions from lower levels arrive and may be stored, but no comparison to references or action ensues. The perception is simply absorbed, perhaps for later use as a reference. Conversely, when the perceptual switch is turned off but the memory switch is set to "on," an automatic mode is engaged. Memory provides a reference for, say, the perception of walking, allowing the lower level systems to keep putting one foot in front of the other while higher level systems consider other issues, such as thinking about work. (Powers says this mode is one we are in often.)

Finally, imagination mode occurs when both perceptual and memory switches are turned off, as illustrated in the diagram. Now the control hierarchy has been short-circuited. Rather than perceptions originating with sensory systems, memory instead supplies a recalled perception that higher levels then perceive as occurring again. When the higher systems compare the perception to their references and send down their response to lower level systems, calling for a different perception to be achieved in order to reduce higher-level error, that perception is again supplied by memory rather than through sensing changes in the environment. As a result, many alternative responses can

be sent down from the higher levels to test out the impact of experiencing a variety of perceptions.

Powers suggests that this kind of processing is what happens during dreaming, which he views as a kind of "feasibility testing" (Powers, 1973/2005, p. 226) where normal constraints to be consistent with reality are loosened. A dream may connect perceptions that have never been, and never will be, connected in "real life," which can account for their strange and sometimes uncomfortable nature.

Additionally, an imagined experience is typically not as vividly perceived as one occurring in real time, in "real life." Powers hypothesizes that this is because not as many perceptions are triggered across the breadth and depth of the hierarchy. As imagined perceptions involve lower levels of the hierarchy, the remembered experience becomes more vivid, as may occur in some dreams. In vivid dreams, with all constraints of interacting with the real world turned off except for autonomic processes, imagination is free to travel all the way down, only short-circuiting just before action, as shown in Figure 3 below.

But when fully conscious, the short-circuiting typically occurs at higher levels. At these levels, the imagination mode allows individuals to engage in more abstract thinking and planning, essentially producing the equivalent of Dewey's deliberation—playing out in dramatic rehearsal potential outcomes until one is found that addresses the indeterminate situation requiring deliberation. In PCT terms, the error created by such a situation prompts entry into imagination mode, which runs stored perceptions through the

hierarchy until a set is found that reduces the error, at which point the hierarchy returns to control mode to begin the actions that will actually produce those perceptions for real, rather than in memory.

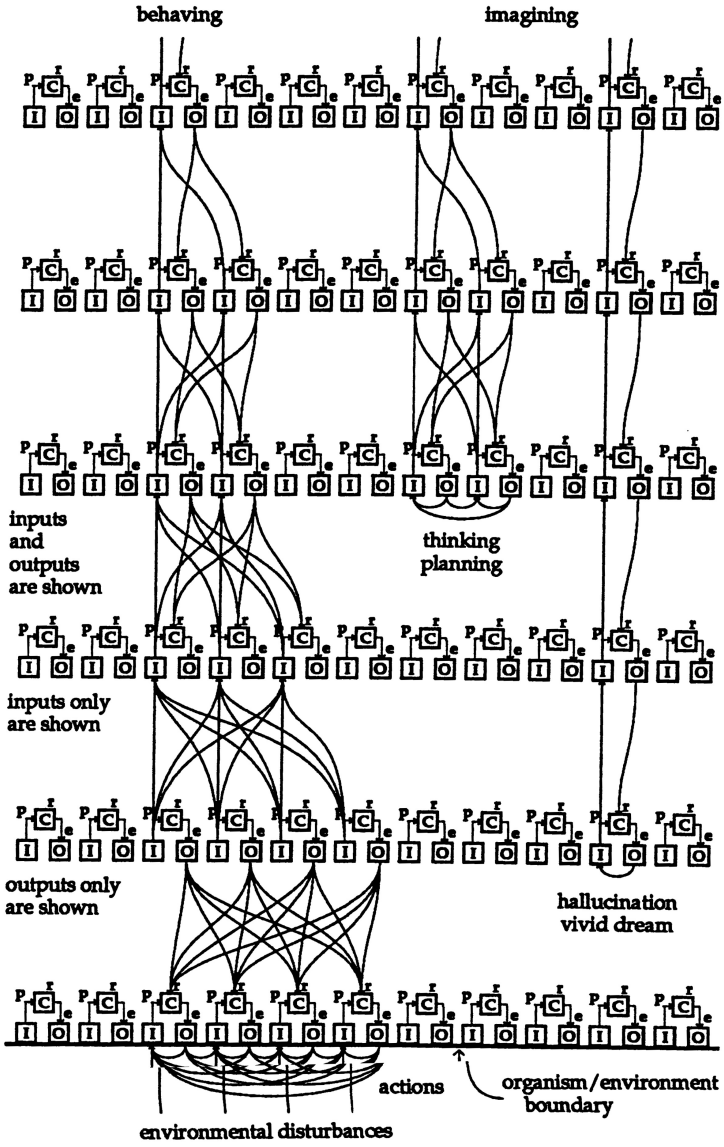

Figure 2. A hierarchy of control

Figure 3. A hierarchy of control, showing the operation of the imagination mode. Figure and caption reproduced from Powers (1989, p. 278), with permission from Benchmark Publications Inc., all rights reserved, Bloomfield New Jersey 07003.

One condition that often gives rise to such indeterminate situations is when there is conflict between control systems. Conflict has a very precise meaning in PCT. It occurs when two control systems have different and mutually exclusive references for the same controlled variable. There is no way for both systems to experience zero error in their goals simultaneously (Powers, 1973/2005, p. 266). For example, one control system may have a reference for the relatively high quantity of food that is consistent with lowering stress levels while another may have a reference for the low quantity of food that is consistent with being healthy. While the conflict is expressed or observed at the level of the "put food in mouth" control system, that lower level control system is actually working fine—it has no trouble getting the food to the mouth. The conflict is caused by it being given two different amounts of food to put in there by the two higher level systems that are in conflict.

The fact that they conflict does not mean the control systems are faulty. They have learned very well what the right level of food is to satisfy each goal, and have developed appropriate output functions to deliver that quantity of food. The issue arises when both are activated at once. At such times, the better each is at controlling the desired food level, the more intense the conflict becomes (Mansell, Carey and Tai, 2013, p. 39).

This is because each system increases its output in response to a perceived error. As a result, their outputs increase to their maximum possible. However, because they are

pushing in different directions on the same variable (one wants more, one wants less), those outputs cancel each other out. At this, point two outcomes are possible.

All systems have limits that, when exceeded, cause a breakdown or collapse. Powers demonstrates this with two people pulling on two rubber bands knotted together. One is told to keep the knot over a one dot on the table. The other is told to keep the knot over a dot ¼ inch from the first dot. First one goal is achieved, then the other person pulls harder, increasing the tension on the rubber band until their goal is achieved, which then cause the first person to pull harder, and so on. This continues until the rubber bands break or one person stops playing the game.

Alternatively, if the maximum output of each system is below its breaking point then the knot comes to rest at a "virtual reference" that is the weighted average of the relative strengths of each control system's output. Both systems remain in perpetual conflict because neither can achieve its reference. Both systems output lots of energy—maximum energy, in fact—but to no avail, making conflict wasteful. Because both systems are maxed out, though, any additional outside disturbance cannot be resisted. Within a range of this virtual reference, then, control is completely lost. This loss of control is typically experienced as vacillation or indecision or behaviors that change with every changing condition.

This kind of experience is common. Continuing the stress vs. healthy eating example, a particularly stressful day may lead to eating a large dinner that night, reducing stress but causing self-criticism. For the next few meals, less is eaten but stress isn't

relieved. Gradually stress builds until, willpower exhausted, a bad day spurs another binge period. Thus, the concept of conflicting eating control systems very well describes the phenomenon of “Yo-Yo” dieting.

When conflict between control systems thwarts their ability to achieve their purposes, this generates large intrinsic errors (Powers, 1973/2005, p. 270), according to Powers, which in turn is felt as strong emotions (p. 256), such as disgust, fear, anger or sadness. Such emotions are seen as a sign that reorganization of the control systems is occurring, and in fact help direct awareness to where in the hierarchy the conflict is occurring and so what portions need to be reorganized. Such a reorganization may result in one of two paths.

More typically, it results in reorganizing to avoid situations where the two systems come into conflict, for example by not getting on the scale and confronting the fact that stress eating is leading to obesity. Such avoidance leaves the conflict intact but unexperienced, at least temporarily, and so the uncomfortable emotions are not experienced.

A more fruitful type of reorganization occurs when it more fundamentally involves higher levels in the hierarchy. After all, the two control systems conflict because each does a good job controlling the same variable. They just are trying to control it to two different levels simultaneously. Those levels, though, are being set by one or more even higher-level control systems. Thus there are at least three levels of control systems involved in any conflict—“the lowest level where the conflict is *expressed* [e.g., food to mouth], the next

level where the conflict is *caused* [e.g., healthy eating vs. stress eating], and at least one higher level that is creating the *situation*[5] that gives rise to the conflict" (Powers, 1998-2010, p. 78, emphasis in the original). It is at the higher level that the conflict can actually be resolved, for example, by invoking an exercise control system to deal with stress rather than the stress eating control system. This then eliminates its conflict with the healthy-eating control system.

Note that awareness must first be shifted to level of the systems causing the situation before reorganization at that higher level can begin. An entire type of psychotherapy called "Method of Levels" has been developed around helping individuals go up a level in their perceptual hierarchy in order to see their conflicts from a new, higher perspective from which they can be more fully perceived, understood and dealt with (Mansell, Carey and Tai, 2013, and Carrey, 2006). These higher levels often surface as background thoughts, disruptions in the flow of a conversation. When awareness is shifted to these signs that something is going on behind the scenes of one's conscious thoughts, a new perspective may suddenly emerge from which the conflict that brought the patient to the therapist's office simply vanishes. Other times, it takes more reflection and work—deliberation, to use Dewey's term—but resolution of conflict nonetheless requires developing a higher-level perception than the level at which it is occurring. Achieving that awareness seems to then initiate reorganization at the level the conflict can actually be resolved.

[5] Powers' term, though it is interesting it matches Dewey's

Note that once the second type of reorganization occurs, the conflict disappears. There is no sense of trying to overcome resistance or doing what one should even though it is hard. A new normal is achieved with all control systems achieving their references with minimal error and minimal effort, as is typical when they are well-organized.

If we substitute "habit" for "control system" Dewey describes a similar process as he examines the relationship between habit, impulse and deliberation. Conflict between habits causes them to stop, releasing emotion in the form of an impulse to do something. "Habit is energy organized in a certain channel. When interfered with, it swells as resentment and as an avenging force" (Dewey, 1922/1988, p. 54). Yet, as Dewey says later, "Conflict is the gadfly of thought" (p. 207), spurring efforts to apply intelligence to resolving the indeterminate situation. As a result, "Emotion is a perturbation from clash or failure of habit, and reflection, roughly speaking, is the painful effort of disturbed habits to readjust themselves" (p. 54). Once habits are readjusted, they again work seamlessly— "…the more suavely efficient a habit the more unconsciously it operates. Only a hitch in its workings occasions emotion and provokes thought" (p. 125).

The most concerning type of conflict between control systems is when one person attempts to control another. By one person creating disturbances in a second's control systems, it is possible to induce behavior that may assist the first person in maintaining her perceptions near her references. Innocuous versions of this occur all the time, as when the first asks the second to pass the salt and the second, controlling for being perceived as cooperative but not at all controlling the perceived position of the salt shaker, immediately

complies. But more coercive versions also occur, as when children are punished to induce obedience, or even more damaging versions as in the case of blackmail, threats of bodily harm or incarceration.

In Powers' opinion, the attempt to control others results from a fundamental misunderstanding of people as autonomous control systems with their own references and goals who will strenuously, and sometimes violently, resist attempts to interfere with achieving the goals that are important to them (Powers, 1973/2005, p. 279). What others would call deviancy, Powers sees as the natural reaction of human control systems resisting disturbances attempting to be imposed on them from the outside. That we are all autonomous control systems defines what it means to be "created equal"—we all work the same way. He describes this idea as "little virus … called PCT" (Powers, 1998-2010, p. 126), one he hopes will work its way into the back of readers' minds and begin a process of reorganization that increases the perception of others as equals. From Powers point of view, then, the only option to create a conflict-free, non-violent society is to give up forever the desire to control others. Instead, interpersonal conflict can only be resolved by negotiations between equals (Powers, 1998-2010, p. 104).

Social PCT

We have now begun to explore the interaction of humans as control systems in social settings. It is here that PCT, as developed by Powers, essentially stops, and extensions have only recently begun to be explored in any detail. Powers clearly saw individuals adversely affected by widely held system concepts that viewed people more as inanimate objects to be controlled than self-aware, purposeful control systems in their own regard. He acknowledged those system concepts were supported by books, institutions and customs, the changing of which may take generations (Powers, 1973/2005, p. 277) Yet, ultimately, those system concepts only had power by virtue of being inside the heads individuals. As mentioned before, Powers did not see society as having a any kind of separate existence from or power over the people who compose it.

The question we now turn to is whether control systems exist outside of individuals, i.e., are there what we might call social perceptual control systems, and if so, how might we describe them? To be clear, in this context, to know there is a control system at work has a very particular meaning—there must be a quantity that is a function of things observable in the environment that would typically change when forces are applied to it, but changes much less than predicted as a result of actions taken by and only by the suspected control system ("Test for the Controlled Quantity," Powers 2005/1973 pp. 234-236).

Taylor (2015) suggests that control systems exist between people as much as they do within people. The simplest such system is composed of two partners who actively

cooperate to influence each other's behavior, which Taylor terms a "protocol loop." In such a loop, there is an initiation by one person and then a corresponding continuation by the other. An example is a newborn and his mother. The baby has an intrinsic reference for not being hungry while the mom has a reference, most likely intrinsic, for the baby's well-being. When the baby is hungry, it may attempt a variety of behaviors, from facial expressions to limb movements to sounds, none of which on their own will allow the baby to eat. A cry, though, will attract the mom's attention and will likely be perceived that the baby is not doing well, that something is wrong. The mom, too, will try a variety of behaviors, from talking to the baby, picking the baby up, rocking the baby, changing the baby, but none of these will matter if the baby is simply hungry.

The error experienced in each person's control systems causes them to reorganize. According to Taylor, such reorganization can occur among control systems spread across individuals as much as they do among control systems within an individual. The reorganization of the baby's systems allows it to learn to cry immediately when hungry, and subsequently to cry in a certain way when hungry, while the reorganization of the mom's control systems allow her to distinguish between the hungry cry vs. the wet cry vs. the "I'm bored" cry vs. the "I'm hurt" cry. Thus a language develops between the two that reduces the error experienced by both control systems, producing for both perceptions that are more stably near their respective references. Note that this language depends upon simultaneously building new perceptions and using them in a feedback system, an

insight Taylor attributes to J.G. Taylor (1963). Perceptions aren't fixed by biology but learned in the context of social situations.

Taylor believes such protocol loops are the way in which language more generally is acquired, as well as culture. Reorganization never completely eliminates error, however, and we never know exactly what perception another is perceiving and controlling. Hence acquisition is never completely the same from one person to another. As the number of people and expanse of time and space involved increase, language and cultural drift occurs, eventually evolving into different social groups, languages and cultures.

Nevertheless, protocols are developed for communication. Once the baby is fed, the crying stops and both the baby's and the mom's well-being is restored. Despite the operation of two separate control systems, error is reduced in both, the opposite of the conflict situation described previously. It is this kind of mutual success that causes them to be frequently used, most often with those with whom we communicate most often—our families, our communities, our colleagues.

Specific protocols are developed for interaction with specific groups. Participating in social groups increases the capacity of protocols to aid control of the environment to match purposes and increase trust. Quoting Taylor:

> To belong to a self-organized group (as opposed to a group defined by some external authority) is to be able to use protocols specific to the group, and to be known by other group members to be able to do so. Since a protocol serves only to aid in controlling some perception through the actions of another person, to belong to a group is to extend the number of perceptions one can control. And the more perceptions one can control, the more comfortable one feels, the less reorganization is going on, and the better one can trust one's social environment (p. 79).

As those protocols become gradually more specific and situationally aware, they support and help define social roles. These roles layer on top of one another, as when one person is a parent, community member and worker. As they do, they also extend horizontally to interact with people in other roles—bosses, co-workers, political leaders, and so on.

The multiplicity of and overlapping nature of such roles have the potential to produce conflict, however. Indeed, without structure, conflict is likely. Taylor points to Powers' arm control simulation as an example of how reorganization can result in a structure nearly free of conflict among autonomous control systems, and suggests that reorganization similarly works both interpersonally and at the level of groups to allow individual control systems to achieve their goals while producing minimal interference with each other.

Importantly, Taylor makes clear that not all groups are control systems. To be a control system, members of the group must have a common objective, a means of perceiving whether that objective is being achieved, and a means of acting in a coordinated way to influence the environment so as to bring the perceived achievement in line with the desired objective to be achieved. Taylor sees protocols as the way in which groups achieve the capacity to act in a coordinated way.

One kind of group that does qualify as a control system is a team. Teams have objectives and the ability to act together to achieve them. Members learn the team's protocols in order to coordinate their activity to maximize their ability to achieve the team

objective without conflicting with each other along the way. Indeed, individuals on the team recognize others as team members by their ability to use the team's protocols appropriately. Those who do are trusted more, while those who don't are trusted less. As individuals learn to perceive themselves as members of the team, this simultaneously creates both an "us" on the team and a "them" not on it. While those not on the team need not necessarily be opposed to those who are on it, competition between teams often encourages such a perception.

Teams are one kind of a broader category of groups—organizations. Organizations may be formal or informal. Taylor observes that formal organizations tend to develop a hierarchical structure of protocols and systems to achieve their purposes. The hierarchy of functions in a formal organization dramatically limits the potential for conflict among people performing different functions, though conflict may still arise between people performing the same function at the same level of the organizational hierarchy. Because in a formal organization has both purposes and the coordinated means to achieve them, and the flow of information in such an organization utilizes protocols and follows a hierarchical structure, Taylor suggests it is possible to treat such an organization as an organism. Indeed, we often speak of companies as individuals.

One key difference Taylor notes between an organismal hierarchical perceptual control system and an organizational hierarchical perceptual control system, however, is the nature of the control systems in the hierarchy. An organization's sub-systems are themselves fully autonomous control systems, whereas within an organism they are not.

There is always the opportunity for an individual to resist a change in references from a higher level, whereas this happens automatically within an organism. As such, organizational control systems require some element of voluntary cooperation at lower levels to successfully control higher level perceptions to their references. This is true even though such cooperation may be obtained by using coercive policies and practices. In practice, such cooperation is usually achieved by the removal of those who have a significant conflict between their own references and those demanded by the organization, removal which may be voluntary or involuntary.

Taylor notes that both living systems and formal organizational systems have evolved a hierarchy of control systems to achieve purposes, and asks whether some manner of hierarchy in the form of differentiated roles is therefore something PCT says we should expect to develop even in informal organizations starting from a perfectly flat structure. Drawing on Power's arm control simulation, a paper by McClelland (2015) described next, and Kauffman (1995), Taylor deduces the answer is essentially, "Yes." The necessity of control to accomplish purpose typically requires the establishment of hierarchy to minimize conflict and achieve effective control.

McClelland (2015) sees the problem society is to solve as one of establishing the stability necessary for people to control their lives in the face of a chaotic world. Control, fundamentally, is produced through the use of a negative feedback loop—a disturbance to perception is countered by action that affects the environment in such a way as to restore that perception. The key point McClelland highlights is that the object of control is

perception, but perception change is indirect; it can only be achieved by first changing the environment.

McClelland uses this insight to observe that one way societies create stability is to alter the environment so as to lower the cost of desired environmental feedback paths, increasing the probability that these chosen feedback paths will be more often traversed. Building roads to lower the cost of traveling to obtain goods and services needed for members of the society to survive and flourish is perhaps the prototypical example. But so is the creation of tools, or the construction of cities, or the display of images. These all make maintaining some perceptions easier and thus more likely to be held by members of the society. That they are physical (even digital images are stored as patterns in a physical medium) means they persist and that many people can experience them (even more so when they can be transmitted into inboxes around the world).

Yet, at the same time these environmental changes make some perceptions easier to experience, they typically make others harder. Automobiles increase the territory that can be perceived as “close by”, but they have made the perception of people interacting daily with horses much more difficult to maintain. More relevant to the concerns of this paper, the widespread adoption of cars and the construction of the roadways to support them have made it easier to perceive homogeneous, low-density, high-income, single-use neighborhoods as successful while making it more difficult to perceive integrated, high-density, mixed income, multi-use neighborhoods similarly so. The least-cost stability paths

created by a society strongly influence which perceptions are most easily controlled, and therefore most likely to be controlled as well.

To what ends these least-cost paths are created—that is to say, to what purposes or references—is determined by a process McClelland terms "collective control." Basically, McClelland takes the results from Powers' rubber band demonstration of the "virtual reference" created when two systems conflict, plus Taylor's protocols, and extends these from two people to an entire society, showing that the principles hold at every stage—small groups and communities as well as society-wide. Collective control works at every level of this overlapping, stratified structure.

McClelland (2004) shows that when multiple control systems are at work trying to control the same variable, the end result is the establishment of a virtual reference that is a weighted average of the individual systems' references. If each system is of the same strength, and maintaining perceptions near that reference is equally important to each system, then the weight is simply the number of people holding each reference. If, however, some control systems have greater strength (i.e., more power over the environment), or if they control this particular reference more tightly than they control others (i.e., they care more, as with an interest group), then the virtual reference will move toward those capable of greater control (i.e., the "gain" of their control systems is higher). Mathematically, the virtual reference is set at the gain-weighted average of the individual systems' references.

This simple setup produces a society in which every person likely feels some conflict, since the virtual reference is unlikely to match any individual reference. Moreover, any one individual's ability to change that reference is extremely limited. To a single individual, it appears that all the other control systems have agreed on the virtual reference, and their power to maintain it equal to their collective gain. Thus, the larger the social system, and the more powerfully some individuals are able to influence others to adopt their references, the more difficult it is for ordinary individuals or small group to change it.

McClelland (2015), following Taylor (2015), calls this large collective control system a "giant virtual controller." While it has super-human strength, in is not a supra-human entity that exists in a different ontological plane, in McClelland's view. It is a natural property of aggregating the influence of individual control systems. Yet it still has many of the properties associated with a society—it constrains the behavior of any particular individual, influences the references those individuals adopt internally and maintain, and so exists beyond the lifetime of individual members as some die and others are born into it.

This giant virtual controller thus establishes references that become embedded in the minds of its members. Those references are supported by the creation of least-cost stability paths in the environment that make it easier to form perceptions consistent with those references than other, more "deviant" perceptions. We thus have the recipe for a very stable society whose goals are difficult to change, and whose environments have been constructed to reinforce the "rightness" of those goals. McClelland cites Feagin's (2013)

concept of a “white racial frame” as an example of a collective control system with a reference for white superiority so prevalent that whites are blind to the head start they have been given by generations of wealth accumulation denied to people of color, and that is continually reinforced by the things in the environment such as media portrayals and the geography of race and wealth.

Given the stability of society governed by giant virtual controllers, one may usefully wonder then, what causes social change in such a system? McClelland cites several possibilities. First, at all times there is both an inflow and outflow of members of the society, and if they differ in their references, this can gradually shift the virtual reference of the collective control system. Second, despite collective control, some exogenous changes—war, new technologies—may be sufficient to disrupt it. This is consistent with Dewey’s (1922/1988) view of what brings social change in a hierarchical society bound by custom:

> But mobility invades society. War, commerce, travel, communication, contact with the thoughts and desires of other classes, new inventions in productive industry, disturb the settled distribution of customs. Congealed habits thaw out, and a flood mixes things once separated (p. 59).

Finally, because conflict always exists, at least some individuals will be undergoing reorganization. While this most often will result in a readjustment that limits conflict with the existing social reference through accommodating it, sometimes it will result in an innovation that allows the social reference to be circumvented. This innovation may then diffuse to others experiencing the same conflict, and eventually reach enough people to begin to affect the gain holding the prior reference in place.

These arguments make purposeful systemic social change in McClelland's model essentially a side-effect of events that occur for other reasons. The net difference in references between newcomers to society and those leaving it may shift virtual references, but creating such a shift is not the purpose of the population migration. War and technology may produce significant social change, but the direction of any social change that follows is essentially random. Even in the case of purposeful innovation by individuals, which particular innovations diffuse, and which diffuse sufficiently far and fast to change the virtual reference, is unpredictable. The only thing predictable is that all these kinds of changes will be resisted by the collective control systems in place at the time.

Thus we return to the question with which we began, what kind of processes are necessary to make the chances for minority-directed minority change less "vanishingly small?" Building on all the research above, a model of minority-directed institutional change is developed in Chapter 4. But first, let us restate and summarize what we have learned so far.

CHAPTER 3

INTEGRATING PCT WITH OIE

The hierarchy of control systems in PCT means it is driven from the top down, and the top-most levels themselves are driven by instincts and institutions, i.e., by both biology and society. While biological and social imperatives may determine what individuals want and need, control systems determine how they are perceived and internalized as references and how individuals act to achieve them. As such, a theory based on perceptual control systems shares the Veblenian point of view that instincts are propulsive and society is dominant, but the individual nonetheless retains significant scope for agency.

Like Veblen's agents, perceptual control systems have purposes—to maintain perceptions near references. Moreover, control systems are always active, always looking to perceive whether purposes are being achieved, and if not, initiate a sequence of behaviors until they are. A social science built on agents who, themselves, are composed of purposeful evolving, learning control systems provides a sound basis for constructing the active, purposive human agents Veblen described and developing economics as the evolutionary science he sought.

In essence, perceptual control systems are analogous to Dewey's habit. Both resist disturbances. Like a habit, the essence of a control system is not repetitive behavior; a control system creates a predisposition to act in ways that allows an organism to consistently achieve a purpose. A control system is arts, that is, it is highly adapted through

experience to help navigate life. A well-adapted control system feels effortless to execute, just as a well-practiced habit does.

While instincts may be the propulsive force that define what we need, control systems determine how those needs are achieved. As a result, Powers says the hierarchy of control systems define us, just as Dewey said the interpenetration of our habits do. We are our control systems. We are our habits. These are equivalent statements.

Many of the Veblenian instincts have a PCT explanation. For example, idle curiosity depends upon first sensing an error. After all, as the story goes, the most important words in science are “Huh, that’s funny.” Something happened that we didn’t expect, showing our preconception to be in error. A previously established reference is required to wonder why something is one way and not another. An understanding of how the world works sufficient to reliably make successful predictions can be considered a step in achieving control of that world. When previously reliable predictions fail, resolving the error through control system reorganization opens a path to both greater knowledge and greater control in the future.

Another name for this process of gradually gaining greater control over one’s environment is, of course, workmanship. Veblen intuited this instinct largely on the basis of what is required from an evolutionary standpoint for humans to have continually improved their ability to apply means to bring desired ends into being. In so far as those ends are biologically required, they in turn have intrinsic references that must be maintained. The means to those ends improve over time using an evolutionary method of random trials and

selectively retaining those methods that do a better job of maintaining those references. In this way, higher levels of control in terms of improved efficiency, reliability and minimization of effort is obtained, i.e., higher levels of workmanship. Both Veblen and Powers view this evolutionary method of learning as something that applies to individuals learning a skill as well as the species discovering new technologies. The search for greater control, like the instinct of workmanship, leads to improvements in the productive life of the community.

Of course, there can be no life of the community without human life continuing. Hence much of our control systems have evolved to stabilize the environment enough to support the life needs of humanity's most vulnerable—its infants and children. Yet human survival also requires survival of the group to which we belong. The necessity of simultaneous controlling for group as well as individual survival provides an explanation for the development of instinct of parental bent.

But the concept of control goes beyond idle curiosity, workmanship and parental bent because it accounts for the self-regarding instincts as well. For example, predation is also a form of control, but it involves controlling one's own references by controlling others without concern for violating their references. Emulation occurs because those whom we observe create references that we then strive to perceive ourselves as achieving. Which references we choose to emulate is based largely on whom we perceive to have the most control, explaining why Smith found we seem to have greater sympathy for the rich than the poor, as well as why processes of collective control result in social references that more

nearly match those of the rich. Judging relative levels of control then forms basis for making "invidious distinctions" among individuals and groups.

Control also helps explain those behaviors that are in-between other- and self-regarding. For example, control can account for cooperative behavior such as reciprocity. Like predation, reciprocity can be viewed as a means of controlling the behavior of others—i.e., I do for you today so that you will do for me tomorrow. But unlike predation, reciprocity allows both parties to achieve their references by essentially establishing what Taylor calls a protocol.

Dewey, for his part, did not find categorizing instincts to be useful. "It is unscientific to try to restrict original activities to a definite number of sharply demarcated classes of instincts" (Dewey, 1922/1988, p. 92). Calling this a "false abstractionism," he goes on to say that, "Theorists differ only or chiefly as to their number and ranking. Some say one, self-love; some two, egoism and altruism; some three, greed, fear and glory; while today writers of a more empirical turn run the number up to fifty or sixty" (p. 92).

For Dewey, either there are too many instincts to be useful or they essentially boiled down to "life is life" (Dewey, 1922/1988, p. 95). Even the distinction between self- and other-regarding instincts did not make sense to him. Life must preserve itself if is to remain alive, and we are all born helpless so "every person learns to recognize to some extent the quality of an act on the basis of its consequences in the act of others" (p. 106).

This focus on the processes of life allows Dewey to find control a more important concept for explaining human nature, though he doesn't use that vocabulary. Dewey's

work squares with Powers in that what we observe as behavior is largely actions in a negative feedback loop intended to maintain previously established references. “The truth is that in every waking moment, the complete balance of the organism is constantly interfered with and as constantly restored….Life is interruptions and recoveries” (Dewey, 1922/1988, pg. 125). That restoration is the function of habit under normal circumstances. However, “With conflict of habits and release of impulse, there is conscious search” (p. 126), that is, deliberation, which ends when habits are reintegrated and control sufficient to maintain references—or in Dewey’s term, balance—is again achieved.

What perceptual control systems offer is a clarification and generalization of Dewey’s concepts of habit, conflict and deliberation. First, it avoids the use of a word “habit,” which to most connotes repetition or unthinking responses to stimulus or cue. Dewey himself was uncomfortable with the word but thought it came closest to the concept he had in mind (Dewey, 1922/1988, p. 31). A perceptual control system clarifies that what is held constant under a variety of conditions is our perception of achieving one of our purposes, not the actions used to achieve this perception. We control our inputs, not our outputs.

Second, it makes more precise what Dewey meant when he said habits are arts. Control systems are learned, finely tuned through reorganization over countless exposures to reality to more assuredly protect what is essential to our survival from a complex, dynamic and ever-changing environment. Moreover, the concept of a hierarchical control system makes clearer how a habit can be flexible and intelligent. Higher levels shift the

references of lower levels when perceptions deviate from references, so while the structure of the control system is more or less fixed, that structure creates a system that can adapt to a wide range of disturbances in the environment. And if that structure proves insufficient to reduce error, the whole structure can evolve via reorganization to become even more intelligent—i.e., to do an even better job of accomplishing purposes by keeping perceptions near references.

Third, Dewey's desire for a broad conception of habit sometimes stretches its use beyond recognition, while perceptual control systems more easily accommodate this conception. For example, Dewey says, "Concrete habits do all the perceiving, recognizing, imagining, recalling, judging, conceiving and reasoning that is done" (Dewey, 1922/1988, p. 124). A perceptual control system clarifies what part of a habit is perception, what part is judging (comparing to references), what part is recollection and how imagination and reasoning take place as the hierarchy is run in imagination mode.

Yet, despite Dewey's broad conception of habit, he stops it at the point of knowledge. "Yet habit does not, of itself, know, for it does not of itself stop to think, observe, remember" (Dewey, 1922/1988, p. 124). Dewey seeks to clarify that habits "know how" to do things, but they do not "know of and about" them. "Knowledge that involves reflection and conscious appreciation is of a different sort" (p. 125).

How can habits do all thinking and reasoning in the first quote, and still be said not to know? This is confusing. Clearly, Dewey seeks to carve a space for deliberation that is different than habit. PCT does too, but does not require setting up an ontological

distinction. For Dewey, the condition that causes deliberation to begin is when habit is stopped by conflict, releasing impulse. As described by Webb (2007), this irritating, disturbed or otherwise uncomfortable (Dewey's word is "indeterminate") situation is felt as an existential imbalance akin to hunger. Such an imbalance initiates a search for a solution that brings the discomfort to an end, that is, where what is discovered during the inquiry process is re-integrated with what was known before so that the situation again becomes determinate.

Thus, deliberation begins not to paper over or avoid the conflict but to "*uncover* the conflict in its full scope and bearing" (Dewey, 1922/1988, p. 150), emphasis in the original). Many alternatives are examined and their consequences evaluated in dramatic rehearsal in the mind until one set is found that resolves the situation. Deliberation ends when a decision is made.

In PCT, deliberation is caused by experiencing the same kind of error condition—a conflict between control systems causing control to cease, creating an intrinsic error akin to hunger. This begins a process of reorganization, which is also a process for searching a solution space. But E. coli reorganization is a more clearly specified search process. It is one of repeated stops and starts, heading off in a direction that seems promising, only to find the situation worsens and having to head off in a different direction. It gives less credence to rational thought and more emphasis on the kind of experimentation that was at the heart of Dewey's approach to problem-solving. As Dewey himself later states, "The truth can be bought only by the adventure of an experiment" (Dewey, 1922/1988, p. 163).

This makes reorganization in PCT a more general problem-solving methodology than deliberation because it may or may not occur consciously, depending on whether the error is occurring in a lower or higher portion of the perceptual hierarchy. Only when the error perceived occurs at sufficiently high levels does it involve reflection and deliberation. High-level errors then cause the mental switches to be then thrown to enter into imagination mode. In imagination, the same hypothesizing and evaluation of ideas occurs as described by Dewey's deliberation, but PCT describes the process of conducting it as one of using the exact same hierarchy of the same control systems—i.e. the same habits—that are used for action. The hierarchy is simply slightly modified to turn off actual action in the environment, with memory of prior actions and their impact on the environment substituting instead.

As a result, deliberation does not run outside of habit. It uses an approximation of habits in action—i.e., the recalled performance of control systems interacting with the environment—as the only knowledge we have to think with. In essence, deliberation is then simply a particular kind of output function in PCT, one using thought rather than muscles to reduce the error in an imagined perception of the world relative to an internal reference of what is good and right. The perceptions involved in making such moral judgments may involve the highest levels of principle and system concept, but solving problems at that level does not require invoking a new ontological level of understanding. As such, PCT provides a more unified framework for problem-solving than Dewey's, where deliberation runs outside of habit in order to tame it.

This is again a case where PCT is perhaps truer to Dewey than Dewey, as the habit he most seeks to engender is the habit of learning. By describing deliberation in the same units as habits and using the same systems as habits, PCT better shows how learning from deliberation is, itself, a form of habit.

While PCT's ability to clarify and generalize habit, conflict and deliberation are important, what is perhaps even more important is that control systems provide a better bridge between the individual and the social. OIE must make an ontological jump from habit at the individual level to institution at the social level. But PCT allows for a more gradual transition, one where a consistent framework can be applied across different levels of social complexity.

For example, Dewey (1922/1988, p. 216) describes a process by which a child begins to understand what is important for behavior by judging the reaction of the adults who surround the youth. This essentially produces a small collective control system where the parents, who have more power, establish a reference for, say, not hitting other children, that the child does not personally have but learns to adopt to avoid suffering the errors caused by parental disapproval. This adoption itself, however, causes errors in the child's normal means of controlling its environment, and sets off a reorganization. With control systems that are more flexible than adults, this results in most children adopting different references for their own behavior, thus internalizing the references of the parents to eliminate the conflict.

Interestingly, such a system of collective control produces a new stable configuration that, upon repeated experience, can become a new jointly held reference for something that does not exist at the level of the individual—in this case, household harmony.

As the circle of individuals involved in the collective control system broadens beyond the household, so may the reference that is jointly held—say, from household to social harmony. At this level, it is unlikely the references will match precisely across individuals and what will be established is instead a collective control system with a virtual reference that is the gain-weighted average of the references of the system's members. Still, such a collective control system may evolve the necessary perceptions and roles to become a full-blown social perceptual control system. Such a system not only possesses a jointly held purpose/reference, but the ability to perceive when that purpose is being achieved or not, and when not, the ability to continually adjust its behavior until control is successful reestablished.

For example, in the society at large, the media clearly play the role of perceptual functions that determine what is relevant to observe. Critics, decision-makers of all kinds, public and private, and even public opinion perform the role of comparators determining whether their perceptions of what's occurring matches their goals for public safety or accountability or profitability. If not, then there are those whose job it is to bring the perceived reality back in line with the goals through outputs such as legislation, policing, regulation or just plain work.

It might be the case that generally people in these roles operate sufficiently independently that true perceptual control is not typically achieved. That is, following Taylor, while we can say that organizational control systems exist (since organizations have purposes they are able to achieve by continuously varying their outputs in order to better bring perceptions into line with references), full-fledged social control systems of the type alluded to above, where there is similar clarity of purpose, coordination of outputs and sufficient agreement of perception to be truly perceptual control on a society-wide scale, is a special case.

Given the widespread nature of Feagin's "white social frame" however, the group purpose of white superiority it maintains, and the many documented mechanisms in place to transmit its perception across the world and maintain it across generations, we argue that institutional racism qualifies as such a special case. More than McClelland's giant virtual controller, a true social perceptual control system is at work. This is the nature of differential power; indeed, it is a definition of it. Those with power have greater ability to maintain their perception of the world near their reference for how the world should be, regardless of what other people's references might be.

Like a giant virtual controller, a social perceptual control system has references that don't match any single individual, perceptions that are not shared by any single individual, outputs that depend on a variety of individuals performing separate roles, and so appears to have a mind of its own. But it actually has its own purposes, its own intrinsic references needing to be met for the entire system to survive, with the individuals who compose it

playing the part of input functions generating perceptions and output functions to control them to the system's intrinsic references. A theory based on perceptual control systems, therefore, may help explain exactly how a separate ontological level emerges, as Sawyer (2005) requires for an adequate social theory (though McClelland would dispute this).

Like the individual perceptual control systems upon which it is based, a social perceptual control system is resistant to change and has real power, the power of habit on a social scale. As you become a part of my control systems and I become a part of yours, the least cost stability paths that are constructed in the environment encourage an alignment of perceptions in addition to references and, as a result, these become increasingly prevalent among our group. As the range of perceptions and references narrow, this makes them more stable and, conversely makes introducing change into such social perceptual control systems even more difficult. One result of this stability of perception and reference is to allow the development of group enforcement mechanisms to maintain those perceptions near the references, mechanisms that are often coercive.

Veblen's word for such a resistant, resilient and prevalent habit of thought is, of course, an institution. It is posited here that social perceptual control systems are analogous to institutions in the same way that individual control systems are analogous to habits. By clarifying what is meant by "habit," control systems also help clarify the meaning of an institution. Veblen's definition—a "prevalent habit of thought"—is usually read with the emphasis on the institution being a "prevalent thought" in the minds of its members. But Veblen's inclusion of the word "habit" was not accidental. An institution is more than a

thought, no matter how prevalent. It is a thought—a reference, in PCT terms—resistant to disturbances, that has enforcement mechanisms (output functions) and learned perceptions to reinforce it. It is prevalent thought, a social reference, with the force of habit behind it.

Note that this comports well with Binmore's (2006) notion drawn from game theory that the game of life, as opposed to some of the toy games often associated with game theory like Prisoner's Dilemma, often provides multiple Nash equilibria for a society to choose from when coordinating behavior. For example, who generally gets to go through a door first when both arrive at the same time, an old person or a young person? The answer will benefit one group and hurt the other. But life is a repeated game, and so there are opportunities for the choice to evolve over time. Binmore allows that the choice is often not random, but driven by the "underlying power structure of a society (p. 24)." Once an equilibrium is chosen, however, it is difficult for a society to move to a different one because the nature of an equilibrium is that it is essentially self-policing; it includes mechanisms to restore the equilibrium if disturbed. This is a property identical to that of social perceptual control systems.

Table 1 summarizes the relationship between PCT and OIE theoretical constructs, as well as PCT's contribution to them. Briefly, control wraps a unifying framework around the Veblenian dichotomy between self- and other-regarding propensities. It takes the fuzzy concept of habit and gives it a more explicit specification as a control system. This allows us to peer inside the black box surrounding the concept of habit to better understand how

they form and how they change. By using control systems as the unit of analysis, PCT opens up the possibility of modeling how the habits of individuals interact, coevolve and become prevalent, i.e., become socialized as institutions. By enabling the view of institutions as evolved social perceptual control systems, PCT offers the ability to span the ontological gap between habit and institution—both are composed of the same stuff, that is, perceptual control systems. As a result, the concept of a control system sits at the nexus between the individual and society, joining habit and institution. allowing a complete journey from instinct to institution and back again with habit—i.e., perceptual control systems—playing the key intermediary and unifying role at the nexus between the individual and society.

Table 1. Correspondence between OIE and PCT.

OIE	PCT Analog	PCT Contribution
Instinct	Control	Veblen's separate instincts are unified as different aspects of control, making them more consistent with Dewey.
Purpose	Reference	Intrinsic references are those required to be kept within a narrow range for organism survival
Habit	Perceptual control system	Clearer specification of what is meant by habit and how something most people consider bad can do all the good things Dewey insists they can

OIE	PCT Analog	PCT Contribution
Habits are arts, positive agencies	Perceptual control systems are finely calibrated through experience to achieve purposes under a variety of conditions	
Essence of habit is in no way repetition	Essence of a perceptual control system is achieving the purposes needed for life	
Habits are flexible, intelligent	Control systems are arranged in a learned hierarchy that adjusts to the environment as it changes. The more control systems, and the better integrated they are, the broader the range of disturbances to which they can adjust.	
Deliberation	Running the perceptual hierarchy in imagination mode	Deliberation need not run outside of habit to tame it. Deliberation uses habits as encoded into memory and the current hierarchy to conduct the required dramatic rehearsals. Habit *can* know, *can* reflect. There is no mode of thinking outside the hierarchy.
Conflict between habits stops their smooth operation, releasing impulse to harmonize them through deliberation	Conflict between control systems creates uncontrolled error, initiating E. coli reorganization.	Change can occur without conscious deliberation. Random changes search the solution space, and change continues in a particular direction so long as error is reduced.

OIE	PCT Analog	PCT Contribution
Institution as “prevalent habit of thought”	Social perceptual control system	Habit at the individual level and institutions at the social level are made of the same "stuff" - Perceptual control systems - easing the transition between these ontological levels
Institutions become prevalent through technological change and emulation	Institutions become prevalent because they are needed to establish control.	Hierarchy is functional in that it speeds control and reduces conflict. Least-cost stability paths make developing and maintaining some perceptions easier than others. Collective control ensures references are weighted toward those with the most numbers and power.
Institutional adjustment-choosing what should be done by those who must alter their behavior	E. Coli reorganization at the level needing to change	Social change can occur without conscious choice by those currently benefiting from the current arrangements…but only if awareness is shifted to the right level of the hierarchy, a gradient of change can be created and random experiments can be generated in response to conflict.

Combining PCT with OIE blends an evolutionary theory of mind with an evolutionary theory of economics and produces a better-integrated theory of individual, social, and economic change. It also provides some clues as to how a “small, committed group” of individuals might intentionally guide the evolution of the larger society toward eliminating the institutional racism embodied in the urban development strategy of “containment plus sprawl.”

That societies might be thought of as composed of social perceptual control systems means that they can be said to have their own intrinsic references—references that must be maintained for the society to survive. When something causes the society to perceive an error in those intrinsic references, and that error persists, it can initiate a period of reorganization producing new references and new control systems until the intrinsic error is reduced to tolerable levels. At that point, the social order has, in fact, changed.

The issues for consciously guiding evolutionary social change then are two-fold. First, how can a small set of individuals or a minority group cause and maintain an error in the majority's perception of their society that is important enough to start the process of reorganization? Second, how can the reorganization process be managed to make sure the changes reliably move society in the desired direction? These are the questions to which we will turn in the next chapter.

CHAPTER 4

TOWARD A CONTROL THEORY OF MINORITY-DIRECTED INSTITUTIONAL CHANGE

We now attempt to apply the understanding of social perceptual control systems developed above to the issue institutional racism with which we began. We have posited that institutional racism is actually an example of a social perceptual control system at work. If so, what, exactly, is its intrinsic reference?

Recall that Charles (2005) considered three possible explanations for racial residential settlement patterns: First, it could be that class is the real driver and that race is merely being used as a proxy. Second, perhaps all groups are ethnocentric and so naturally have a preference for living with others like themselves. Finally, perhaps preferences are driven more by prejudice against an "out-group" than by desire to live with co-ethnics. She designed an innovative survey technique to disentangle these alternative explanations that, from a PCT perspective, allowed her to conduct a test for which particular racial perception whites are controlling when they make residential location choices. She found that the controlled variable most consistent with the data was a particular variant of the out-group prejudice explanation—that of maintaining relative group position. That is, white residential location choices were made to keep them in a superior position relative to blacks and maintain as much social distance from them as possible, not simply to avoid contact with them.

This is entirely consistent with Feagin's (2013) thesis that the existence of a white racial frame has at its heart a reference for maintaining white superiority. This myth of

superiority was created in order to generate the social distance and emotional detachment required to enslave other human beings. It is nearly four centuries in the making, part of the nation's founding documents and the structure of its governing institutions.

In their review of the history of racial attitudes from the General Social Survey, Bobo, Charles, Kryzen and Simmons (2009) similarly found that white attitudes toward of blacks continue to exhibit a perception of considerable social distance and emotional detachment to this day, with whites blaming black circumstances on black culture. Moreover, what they term collective racial resentments are "the sine qua non of the new racial ideological regime in America," as represented by the "belief that blacks are singularly undeserving of 'special treatment'" in the form of public policy and "should just sink or swim in the modern free market."(p. 41)

This work provides support for the idea that white superiority is a key intrinsic reference that the prevalent social perceptual control system actively defends. Yet such a nakedly discriminatory reference is little spoken of in most settings. Recall the five American values described earlier that Briggs identified as both underlying the "uneven geography of opportunity" and serving to make it a relatively invisible social problem today:

1) The attractiveness of a place can be best judged by the status of the people who live there.
2) Communities are defined by the homogeneity of race, class and home values.
3) Political decisions should be made at the lowest possible level government.

4) Markets are capable of meeting all needs.

5) Income is determined by individual effort.

These "American values" can now be seen as providing ideological cover for a reference of white superiority. They are thinly-veiled substitute references, ones that *can* be spoken of in "polite company" but have the effect of cementing in place racial disparities and justifying their continuation as the result of deficiencies in minorities, both as a group and individually.

Given this intrinsic reference for white superiority, then it is little wonder that the strategy of containment plus sprawl as described by Briggs emerges as one of the most important output functions the prevalent social perceptual control system uses to defend it. Physical distance promotes the emotional distance and, as documented by Charles, prejudicial attitudes of whites against blacks are significantly stronger if they have little or no experience living or working in racially integrated environments.

Meanwhile the "uneven geography of opportunity" that results perpetuates the economic advantages of the majority over the minority, thereby reinforcing perceptions of white superiority. Disparities in wealth create disparities in equality of opportunity, and such disparities persist because the majority can avoid the conflict of seeing and dealing with the problems created by high-poverty, largely minority areas simply by moving away from them, and then blaming the poor for their poverty.

That the fact of the container remains despite significant disturbances in the form of both adoption of new technologies and changes in law regarding schools, housing,

voting and employment is exactly the kind of resilience one would expect from a control system. While such legal and technological disturbances may temporarily create environments that make it harder to hold on to perceptions of white superiority, the capacity of real estate practices to reorganize has thus far proved more than capable of simply adjusting the shape of the container in order to leave fact of containment plus sprawl, along with the racial disparities in opportunities it creates, essentially intact.

The minorities who are so contained experience on a daily basis conditions of deteriorating infrastructure, poor schools, vacant structures, high crime, inadequate housing and lack of access to economic opportunity. While all who live in concentrated poverty experience these conditions, in many metropolitan areas, they disproportionately impact African-Americans. For example, in metropolitan Kansas City, approximately 70 percent of poor blacks live in urban core census tracts where poverty rate is at least 20 percent, compared to only 15 percent of poor whites (MARC, 1993). Consistent with Galster's model of cumulative causation, such conditions cause minorities to experience economic deprivation, which is another way of saying their intrinsic needs aren't being met, causing them to live with high levels of error in their intrinsic references.

Living with constant error is likely the source of the depression, anger and apathy that Galster sees as the source of non-standard behaviors—welfare dependency, drug abuse, crime, unwed pregnancies—that further reinforce prejudices of the majority against the minority. In fact, following Powers, those non-standard behaviors, while called "deviancy" by the majority, are actually the result of autonomous control systems

innovatively seeking to reduce the errors perceived using whatever avenues are open to them. While drug abuse alters those perceptions directly without changing the conditions actually causing the error, some non-standard behaviors cited by Galster, such as welfare dependency, represent an attempt to minimize the economic deprivation, while others, such as gang participation resulting in crime, may be an attempt to regain some of the esteem lost as a result of the economic disparities relative to the majority.

Galster's criticisms of the three different kinds of policy interventions aimed at reducing the black underclass—"break the linkages," "reverse the cycle," and "establish a parallel system"— also show awareness of the existence of a social perceptual control system, though he doesn't call it that. He characterizes "break the linkages" as a strategy that focuses on eliminating one link in the chain of cumulative causation, and criticizes it as leaving too much of the rest of the system in place. To a control system, such a single change is simply a disturbance it is organized to defend against. He criticizes "reverse the cycle" as leaving the attitudes of the majority unchanged, so that policies such as dispersing affordable housing the suburbs have mixed results. A control system encapsulates such attitudes as references, and the intrinsic reference for white superiority has proved resilient in the face of dramatic policy intervention. So long as this reference remains intact, whites can often limit their exposure to places where such policy is being applied or use their considerable social and economic power to oppose directly it. Finally, Galster criticizes the strategy to "create a parallel system" because it depends on support from the majority to survive. From a PCT perspective, he is right to question the viability of

this strategy, for so long as the intrinsic reference of the majority remains one of white superiority, minorities living the parallel system are unlikely to be allowed to achieve outcomes equal to those of the majority.

As a result of living in vastly different environments, majority and minority have different perceptions and develop different references. Dewey (1922/1988) understood as much:

> For segregated classes develop their own customs, which is to say their own working morals. As long as society is mainly immobile these diverse principles and ruling aims do not clash. They exist side by side in different strata (pp. 58-59).

The notion of collective control systems, however, suggests that the "segregated classes" are not as completely separate as Dewey imagined. Instead, their references inhabit the same space and regularly conflict, but those of the majority have much higher gain. As a result, the virtual reference, i.e., the reference that is socially experienced, is heavily or almost entirely weighted toward the majority's reference. Consistent with Galster, the result for the minority is to constantly live with relatively high levels of error while the majority is able to live mostly unaware of it.

That the majority could live unaware and unconcerned of the conflict experienced by the minority is exactly the expected result when a perceptual control system is in place. First, such control systems organize themselves into autonomous, specialized, non-conflicting sub-systems, as in the arm control demo of Powers. Second, they are organized in a hierarchy in order to address conflicts that may not be able to be solved by reorganization at a lower level and require "going up a level" to set new references for

lower levels that eliminate the conflict. Third, that hierarchy itself is likely a response to prior persistent conflict that required evolution of a higher-level perception, a new perspective, in order to achieve better control. Fourth, such evolution is not random; it is purposeful. It is consistently pushed in a direction dictated by the need of the overall system to survive. Those sub-systems of the hierarchy responsible for monitoring the variables intrinsic to the overall system's survival initiate reorganization when intrinsic errors grow sufficiently large, and they evaluate which changes produce improvements. Fifth, the references for what is needed for survival are largely, though not entirely, determined at the highest levels of the hierarchy[6] (recall that for Powers, instincts, which are presumably related to maintaining intrinsic references, operate at the highest, not lowest, level of the hierarchy). The end result is, sixth, a well-organized perceptual control system that rarely experiences intrinsic errors. Lower levels control well and work so fast that higher levels aren't aware of lower-level errors. Only when such errors persist unresolved do the higher-level systems engage to reset references or, if necessary, reorganize the system itself.

Applying this model to social systems, people become the individual control sub-systems orthogonally organized to minimize conflict. As they pursue their own individual

[6] I diverge somewhat from Powers here, however. Powers saw the reorganizing system as separate from the learned hierarchy of control. I see it as embedded within the hierarchy, as Powers also allows. Powers does not specify a level, though, while it makes the most sense to me that what is intrinsic to system survival be a top-level function. My supposition is supported when Powers says that as one moves up the hierarchy, the control systems become more general and operate more slowly, and that the reorganization system is the most general type of control system considered. These two conditions imply it operates at the highest levels.

goals, reorganization yields individuals who engage in specialized production and occupy a variety of social roles that allow them a high degree of autonomy. Those roles are arranged in hierarchies, most clearly within formal organizations but also within informal organizations (following Taylor) and the society as a whole. Those at higher levels are typically responsible for maintaining higher-level perceptions and have the power to do so by setting the references (or, as Powers puts it, calling forth the perceptions) that need to be reproduced by lower-level systems. In organizational control systems they may set references for people at lower levels by directly calling for the perceptions to be reproduced in a command and control environment. In the larger society, those higher in the hierarchy may influence references indirectly by setting examples that those lower in the hierarchy perceive and then emulate, following Smith's greater sympathy for the rich and Veblen's emulative instinct, or by influencing the construction of least-cost stability paths in the environment that reinforce the desired perceptions and references. Following McClelland, those references become very stable through the process of collective control. As generations unfold, those born into the references and stability paths see them as normal and natural, not the result of a purposeful evolutionary process. In fact, because most individuals autonomously pursue their own goals with minimal conflict, they are likely to protest that any such larger social purposes exist.

Their cooperative nature is part of why such social perceptual control systems so difficult to change. The autonomy of individuals makes it hard to perceive typical social interactions as a part of a control system. That we learn the references, perceptions and

behaviors of those who surround us so early in life make them appears as a fact of life rather than socially constructed. Majority or minority, higher-level or lower-level, we all learn to cooperate to some extent with the dominant social perceptual control system, because the consequences of not cooperating make it even more difficult to control the intrinsic variables for life—food, shelter, transportation, and being valued by others.

Such cooperation does not mean there is a complete absence of conflict or that the cooperation isn't at least somewhat coerced. In families, for example, there is often conflict among members but also enough cooperation for them to form a functioning household. Yet, to control the amount of food on the table, the existence of a roof over their heads, gas in the tank of their car, and the esteem of friends, family, colleagues and neighbors, most people find it easier to adopt the references and behaviors of those they interact with. Even perceptions are not given from outside; rather what becomes important to perceive is largely learned from the people and situations that surround us.

Despite the cooperative nature of such social perceptual control systems (hence, we may also call them as "cooperative control systems"), the fact remains that its references reflect a weighted average of the goals of the system's most powerful and most numerous members. This weighting means that the intrinsic references for survival of the overall system often most closely match those required for the survival of the group containing the most powerful, and often results in behaviors to protect perceptions of that group's position, as in the case of institutional racism described above. The absence of conflict among those in the majority serves to keep this purpose hidden from most,

allowing them to attribute their success to their individual efforts apart from any boost given by the evolved system structure. Only the relatively small number of people whose intrinsic references are experiencing substantial errors because of the way the social perceptual control system is working, i.e., minorities, are continually reminded of the existence of a social perceptual control system with its own purposes, ones that are different than their own.

This setup describes the most salient features of Feagin's "white racial frame." It also explains why a well-organized social perceptual control system would evolve a strategy of containment plus sprawl. Such a strategy maintains the reference for white superiority while minimizing any conflict the majority might experience by having more than occasional contact with minorities living in the constant error induced by economic deprivation, disinvestment and disparity.

Given the above discussion, the difficulty of changing a well-organized social perceptual control system cannot be underestimated. Nevertheless, that its evolution was purposefully directed is hopeful, because what is purposefully directed can be purposefully re-directed. However, the change must be of a particular type to be lasting. Perceptual control systems only change, evolve, or learn through a process of reorganization, and the necessary conditions for such a reorganization are fairly clear.

The process of reorganization is initiated through the existence of conflict that threatens the intrinsic references of the system. Such a conflict is relatively easy to create—anyone can start a fight—but hard to sustain and manage since the power of those

benefiting from the current system to ostracize, imprison or, in the worst cases, kill those who threaten it makes direct confrontation unlikely to achieve the desired social change. Instead, echoing Foster, reorganization must be directed to level needing to change, i.e., the higher levels of the hierarchy that actually have the power to make changes that eliminate the conflict. As such, awareness of the conflict, and indeed, the conflict itself, must become internal to those occupying the higher levels.

So how might such a reorganization of a social perceptual control system proceed? It seems that there are at least four necessary ingredients for reorganization to occur in PCT: 1) large, persistent error in an intrinsic variable, most often caused by 2) a significant conflict between control systems, 3) the existence of a higher-level control system operating at the level of the situation causing the conflict capable of altering the references for the conflicting control systems to reduce error—if it had the right parameters, and 4) a sufficiently steep gradient for those parameters that, once the random experimentation of the reorganization process begins, can be detected and followed so that they change in a direction that reduces error. Thus, while conflict between control systems may initiate the process of reorganization, the reorganization is truly successful only if, in the end, the result is a substantial reduction in conflict in the overall system.

It is clear that #2 and #4 above have been part of most social change movements. Abolition, women's suffrage, unionization, civil rights, women's rights, gay rights all have used conflict to shift awareness toward a part of the social system that needs reorganizing, then persisted long enough and used increasingly innovative tactics to create a gradient of

change, so that when social system parameters change, they change in the desired direction—i.e. toward the references for greater equality and the increased justice that the social change movements are trying to establish.

How they use conflict to generate #1 - i.e., large, persistent intrinsic error - is, of course, a major issue. While violence has been a part of many of these movements, it typically stimulates a strong public backlash against those who use it and so tarnishes their causes. Thus, violence seems to further the cause of social change most successfully when, unfortunately, it is perpetrated *on* those seeking change *by* those who purport to be defending the references of the larger society. The public revulsion against the violence, and the public sympathy generated for the victims of it, helps to move references away from those previously established references. Yet the tragic loss of life and property required to produce such revulsion makes putting people in situations where violence is likely to be done to them and extremely costly strategy.

By contrast, when violence is perpetrated by those trying to create social change, the public backlash against violence most often hardens the support for those previously established references. It creates an external conflict rather than an internal one, and so calls forth all the power of the existing control system's power to resist disturbances, which of course is what it was designed to do. To avoid setting off the control system's well-honed defenses, creating conflict using non-violent means is a surer a path to shifting awareness in a way that might trigger intrinsic error from within, and at the levels of the hierarchy that are likely to be capable of changing the conflictual situation.

Non-violent tactics are also a surer path to creating a consistent, steep gradient for change in the desired direction of those seeking it. Two modern examples, one on the right and one on the left, have successfully used non-violent means to create the gradient necessary to shift social references. On the right, businesses in the 1970s joined together to more effectively counter what they saw as attacks on the free enterprise system by consumer advocates, environmentalists and college campuses. Foreshadowed in a 1971 memo by soon-to-be Supreme Court Justice Lewis Powell to the U.S. Chamber of Commerce (Powell, 1971), business groups formed and funded effective lobbying organizations, legal defense teams and think tanks to counter these attacks. They also funded political action committees (PACs) to finance the political campaigns of both Democrats and Republicans, as well their own research to counter more traditional research that was government-funded (Schmitt, 2015). Ultimately, organizations such as the Heritage Foundation, the American Enterprise Institute and the Cato Institute, as well as the advent of conservative media ranging from the Wall Street Journal to talk radio to Fox News successfully reframed issues as being caused by a lack of adherence to traditional American values, and in so doing, were able to take advantage of white America's fear of the social, economic and demographic changes underway and religious America's fear of moral relativism. As a result, though they started in the 1970s from a minority position, businesses and conservative groups have been largely successful in gaining sufficient support to move the country's virtual references rightward, as evidenced by laws to decrease regulation of business and finance, reduce access to abortion, increase

restrictions on voting rights, weaken unions and diminish support for affirmative action, while stalling action on critical issues such as global climate change and habitat preservation.

Meanwhile, on the left, those seeking equal rights for people who are gay were able to advance favorable portrayals on TV and in the movies that showed gay people with the same problems and the same hopes and dreams as everyone else. Also, the process of “coming out" and that fact that somewhere between 3 and 5 percent of Americans are gay (Newport, 2015) means that virtually every extended family is likely to have at least one person who is gay, forcing even very conservative individuals to face a conflict between their theology or ideology and maintaining relationships with people they love. Rising awareness and the efforts of gay rights advocates have been effective in shifting references of the majority from seeing gay people as abnormal to seeing them as normal, to the point where 63 percent believe gay and lesbian relations are morally acceptable and 60 percent support gay marriage. It was in this context that the Supreme Court ruled on June 26th, 2015 that the constitution requires states to allow people of the same sex to marry.

Of the two cases, the second is more relevant to racial minorities seeking a reorganized society. The first approach relies on the considerable power of the business community to move the gain-weighted virtual reference of society in its favor, but substantial conflict remains. For example, a majority of Americans are opposed to certain conservative priorities such as eliminating abortion (Saad 2015a) and in favor of certain liberal policies, such as responding to prospects to climate change (Saad 2015b). Not only is

such power unavailable to racial minorities, the second case actually succeeds in changing the reference of the majority of the American public. This includes businesses, as shown when several major firms in Indiana objected to the passage Religious Freedom Restoration Act in April 2015 that allowed businesses to refuse to provide services for gay marriages, which were already legal in the state. As a result of the strong protest, within 48 hours, the governor and legislature amended the law to prohibit such discrimination (Frizell 2015).

The biggest issue in producing minority-directed reorganization of a social perceptual control system is #3 above, engaging a control system at the level actually causing the conflictual situation to reset the references of the lower levels so they no longer conflict. This is particularly difficult when there is disagreement whether such higher-level control systems even exist. In fact, they might not. There may not yet be a level of the currently dominant social perceptual control system capable of achieving the perceptions, the perspective, necessary to solve the conflicts caused by continuing racial disparities.

How higher levels of the perceptual hierarchy come into being, is not well-defined in Powers, but it appears likely that higher-level perceptions, and so higher levels of the perceptual hierarchy, evolved out of the same reorganization process that allows the current hierarchy to adapt to situations causing intrinsic error. Recall that higher level perceptions are constructed out of vectors of lower-level perceptions. When the current hierarchy is unable to reduce intrinsic error to tolerable levels, the random searching for a direction that reduces intrinsic error may sometimes, though perhaps only rarely, combine

current perceptions in a new way that generates something fundamentally different, a new way of perceiving things, a higher-level of perception that, from this perspective, opens new paths for potential solutions and the possibility of evolving new output functions to take advantage of them. If such a new perspective requires the evolution of new physical perceptual machinery or new cognitive capacity (i.e., new "wetware"), then such new levels of perception can only happen in evolutionary time-scales. But if what is required is a new level of social perception, then such a change may happen in social time scales.

From a control systems perspective, hierarchies evolve because they are functional. Persistent conflict is inherently wasteful as the output levels of competing control system escalate in their attempt to achieve incompatible references. Hierarchies are functional in that they reduce conflict and increase the ability to control the variables intrinsic to the overall system's survival to their intrinsic references. A hierarchical perceptual control system calibrated to its environment is highly flexible, responding quickly and surely to disturbances, much like Dewey's flexible and intelligent habit.

Yet, when awareness of the conflict only extends mainly to one part of the overall system, a minority whose impact on the system-wide gain-weighted reference is small, hierarchies can freeze that conflict in place. That, from the standpoint of minorities, there is much conflict but no reorganization implies it is the wrong kind of conflict. The conflict remains *between* control systems (one of which is vastly more powerful than the other) rather than *within* one, externalized rather than internalized. As such, the separate control systems are doing what they are designed to do, resisting outside disturbances to the best

of their ability, without evolving a capacity to go up a level to reset references based on a perspective from which the problematic situation can actually be resolved.

Hence, the conflict builds until, as Dewey puts it, “mobility invades society” and a crisis erupts that demands the awareness of the conflict and the reorganization necessary to deal with it. Unfortunately, in the throws of such an eruption, the reorganization is more likely to result in merely reducing the minority’s ability to create conflict than to actually resolve the conflict they are experiencing.

Like Foster and Dewey, we seek a less crisis-driven approach, one that more dependably results in the development of a more flexible and sensitive higher-level control system that is capable of actually resolving the problematic situation.

If hierarchies increase control at the expense of increased rigidity, then one avenue for making change more regularly evolutionary than sporadically revolutionary is to decrease the amount of hierarchy. Another term for decreasing hierarchy in social systems is increasing democracy. Building stronger democratic institutions, or taking better advantage of the ones already in existence, allows the conflicts and errors of minorities to be expressed more fully and clearly, which in turn increases the chances of their legitimacy being recognized by the majority. As a result, the chances of generating a more system-wide reorganization to eliminate those errors also improve.

From a PCT perspective, institutional evolution might then be described as a process of continually re-balancing the control benefits and relative (though circumscribed) autonomy generated by hierarchy with the innovation benefits of increased democracy.

The messy, often contentious but more meaningful engagement and interaction generated by greater democratic participation can, in turn, yield more productive conflict, i.e., conflict that produces more frequent, more sensitive, and so more thorough, reorganization.

The above discussion permits the beginnings of a control theory of minority-directed institutional change, using institutional racism as a case study. It is presented in outline form because, at this stage, it must be admitted it is unfinished, with many details and some substantial gaps still to be filled in. Also, while the strategies towards the end are presented sequentially, in reality they will likely need to be simultaneously pursued so they become mutually reinforcing. Nonetheless, this description of a control-based theory is, hopefully, a useful start:

1. We live embedded within a social perceptual control system. Perceptual control systems are composed of input functions, references, comparators and output functions arranged in negative feedback loops to maintain a balance with their environment so as to match evolved reference states. They do not control their outputs. They control their inputs, which are perceptions of the current environmental state. Outputs vary to counter environmental disturbances in order to maintain perceptions near their historically-derived references.
2. From this control theoretic perspective, the problem of institutional racism is one of a reference for white superiority that evolved over nearly four centuries and is defended by a variety of output systems. These include the foundational documents of the United States, legal principle, law enforcement, media

imagery and portrayal, fictionalized and mythologized histories and ideological justifications. As a result, most changes to the environment are insufficient change this reference. The whole system has evolved to protect its references against environmental disturbances. Relatively recent changes in civil rights law and advances in information technology…these are mere environmental disturbances to a social perceptual control system.

3. Perceptual control systems evolve a hierarchical design to minimize conflict and keep perceptions of important variables near their references. While higher levels in the hierarchy achieve fine-grained control by calling forth the lower level references to be perceived, the high-level references are relatively unchanging.
4. The highest-level references are a system's intrinsic references, those that are necessary for its survival. To a large degree, what is necessary for system survival is determined by the highest levels of its control hierarchy.[7]
5. Moreover, the process of collective control sets a virtual reference that is the gain-weighted reference of the members of the system. While this ensures the social references actually experienced don't completely correspond to any individual's references, they reflect most closely the references of those

[7] While it is clear for individuals that some intrinsic references occur at lower levels, such as the sensation of zero hunger, others are related to instincts, which Powers locates above system concepts, the highest level of the perceptual hierarchy specified. In social perceptual control systems, given the highest levels are where power is concentrated, the rationale for locating references intrinsic to system survival at the highest levels is, admittedly, clearer.

members who are most powerful, where power is generated by a combination of numbers of people and resources at their disposal.

6. The only way to change high-level references is to reorganize the social perceptual control system. While reorganization is an evolutionary process, in that it generates random trials and selectively retains those that diminish error, it is not Darwinian. It is purposeful, moving in a direction set by the system itself, i.e., away from intrinsic error the system has defined, and maintaining that direction so long as it continues to reduce intrinsic error. As a result, reorganization operates at much faster speeds than natural selection.
7. What is purposefully directed can be purposefully re-directed.
8. Reorganization appears to occur most often in output systems, less often in perceptual input systems and least often in references.[8] Since references are simply previously stored perceptions, the target of reorganization for purposes of achieving a stronger reference for racial equality must be to change perceptions, not merely create different system outputs.
9. Therefore, for minorities to change the references of the majority, they must create intrinsic error that puts the survival of the control system as it currently stands at risk. But creation of this error must be accomplished in a particular way. It is not enough to simply threaten the existing system. It is not enough to

[8] This ordering reflects the fact that references represent a distillation of what is essential based on prior experience. As a result, they are often held even in the face of new evidence to the contrary and can color perceptions.

secure changes in observable behavior. Intrinsic error must be created in ways that specifically challenge perceptions of white superiority.

10. Such intrinsic error begins with conflict between control systems that is perceived at the level of the hierarchy needing to be reorganized, at the level actually causing the conflictual situation, i.e., the highest levels of society.
11. Because the current reference for white superiority is held in place by emotion-laden stereotypes and images, it must be countered by equally strong emotion (Feagin, 2013, pp. 208-209). Conflict between control systems generates error, which in turn generates strong emotion. As Dewey says, stopping a habit creates impulsive energy that must be released; something must be done.
12. The type of conflict matters. The current dominant social perceptual control system depends upon the cooperation of its members to achieve smooth control, even those that are currently in conflict with it. Thus non-violent, non-cooperation[9] with the existing social perceptual control system emerges as the strongest and most constructive kind of conflict.

[9] The author wishes to acknowledge Richard Attenborough's 1982 movie, *Gandhi*, as where he first heard this translation of satyagraha, the civil disobedience practiced by Mahatma Gandhi as part of the movement to gain India's independence from Great Britain. For more on the theory on and application of non-cooperation as part of a non-violence strategy see Sharp (1973). For more about Gandhi's non-violent action, see the website of the Gandhian Institutions-Bombay Sarvodaya Mandal & Gandhi Research Foundation at http://www.mkgandhi.org/main.htm

13. Again, the non-cooperation must be targeted to challenging perceptions of white superiority. Potential strategies are many. Below are some that seem especially relevant to this control-based theory.

    a. *Shift awareness of the conflict to the right levels of the hierarchy.* If useful, productive conflict is being suppressed by a hierarchical social perceptual control system, then the first step is to increase and shift awareness to the conflicts being experienced by the minority.

        i. Facts still matter. Perceptions aren't simply taken; to a significant degree, they are chosen ("cherry-picked") to minimize error with respect to established references. Therefore, the mere reporting of facts counter to those references is unlikely to change them for all but the most objective-minded individuals. Still, compelling facts that instead challenge existing perceptions can open the door to more consideration of alternative points of view. For example, Reeves' (2014) research, that while white children born into the lowest income quintile have a roughly equal chance of ending up in any income quintile as an adult, similarly poor black children have a 50 percent chance of remaining in the lowest household income quintile and almost no chance of climbing to the top income quintile, contradicts the belief that the U.S. is a

meritocracy where income is determined only by individual effort.[10]

ii. Protest. Protests such as "Hands up. Don't Shoot!" following the shooting of Michael Brown in Furguson, Missouri, by a white police officer and "We are the 99%" as part of the Occupy Wall Street movement are useful for shifting awareness to the conflicts being regularly faced by the powerless that are being ignored by the powerful. The latter protest highlights that concepts of "majority/minority" employed here refers to the distribution of power more than numbers of people and that Smith's greater sympathy for the rich and the gain-weighted nature of social virtual references can result in those with a majority of numbers but a minority of power still having references more aligned with those of the powerful than their own self-interest. Hence, the protests are useful for raising the awareness of the minority as well as the majority.

iii. Engagement to shift awareness. Engagement, if authentic, builds relationships. It is during the course of an ongoing relationship between members of the majority and members of the minority that background thoughts and disruptions in the flow of a

[10] In addition, the YouTube® video accompanying Reeves (2014) shows how such dry facts can be compellingly told. See here: https://www.youtube.com/watch?v=t2XFh_tD2RA

conversation might emerge to which the “Method of Levels” could be applied. By shifting awareness to these signs that something else is going on behind conscious thought and everyday thinking, a new perspective or higher-level perception may suddenly emerge from which new ways of addressing conflicts between the two groups can be developed.

iv. Increase democracy. In a hierarchical society, increasing democracy opens avenues for awareness of conflicts faced by minorities to increase, making them harder to ignore and forcing those errors into the evaluation of whether a proposed or actual change moves the system in the right direction. Democratization ensures something closer to decision-making as a negotiation between equals favored by Powers, while minority non-cooperation makes clear the power doesn’t all belong to the majority. Minority participation in decision-making should be increased not only as a part of political processes, but greater participation should be extended to boards of civic, philanthropic, non-profit organizations as well as boards of corporations. As participation increases, the gain-weighted virtual references underlying decisions should also change in favor of greater racial equality.

b. *Call forth the new reference*. Minorities can act as the higher-level control system calling forth the reference to be perceived, even though they are typically viewed as a part of the lower, not higher levels of society. The extent to which the new reference is compelling can add voices from the majority to it, gradually shifting the social perceptual control system's virtual reference.

    i. Black Lives Matter. This movement in response to police shootings of unarmed black men is, perhaps, the best current example. Going beyond "Hands up. Don't shoot!", it clearly states a new reference rather than only drawing attention to an injustice. That it challenges the existing reference is evident in the general white response that, "No, *all* lives matter." The defensive nature of this response indicates the movement is succeeding in provoking whites to at least begin reassessing their previously unexamined assumption that law enforcement has historically treated black and white life equivalently.

    ii. One humanity. Martin Luther King's soaring oratory linked black freedom, justice, and equality with a vision for a universal kinship among people of all races, creeds and colors, where "white Americans could extend a hand of brotherly and sisterly love to blacks…embrace strangers as familiars, and conversely deny that

blacks' humanity was a new and strange thing" (Lebron 2015). This vision of one humanity, full and complete for all, continues to create a vast gulf between it and the current reality. Such oratory has been largely absent recently, but if given new voice could still challenge the dominant reference for white superiority and set up a gradient for change in the direction of a reference for racial equality. Feagin calls the development of such an alternative reference linking freedom, justice, equality and full humanity an "authentic liberty-and-justice framing of society" (p. 204), a strong counter-frame to the dominant liberty-and-justice frame that hypocritically applies only to whites.

c. *Directly challenge existing perceptions of white superiority.* Conflicts with existing perceptions can spur their reorganization. Since references are stored perceptions, this can help reinforce the alternative reference being called forth.

    i. <u>Name the existing reference</u>. Simply naming the existing intrinsic reference as "white superiority" challenges perceptions of it. It is the nature of a social perceptual control system for its references to be considered normal. However, this name conflicts even with the hypocritical "liberty-and-justice" frame held by most whites, let alone the reference for authentic racial equality being called

forth above. Since references are stored perceptions, such conflicts can call into question prior perceptions and begin their reorganization.

ii. De-framing. Feagin suggests that in addition to the strong counter-framing above, strong de-framing will be also be required to successfully conflict with and ultimately replace the intrinsic reference for white superiority (Feagin, 2013, pp 204-211). De-framing requires educating whites concerning the many ways in which the clearly observable advantages of whites in wealth and power are built on centuries of racial oppression. This changes the perception of white advantage from being a sign of superiority to being "ill-gotten goods" obtained immorally, more deserving of apology and restitution than celebration.

iii. Develop counter-images. Much of our perceptions are formed based on what we see occurring together, following the "fire together, wire together" principle (Adams 2014). Therefore, a part of the counter-framing will require distributing images that conflict with those seen on TV news and entertainment programs. Because many of those images are emotion-laden, the counter-images will need to be similarly emotion-laden, though with positive rather than negative emotions. Indeed, Feagin cites

research that showing images of blacks in non-stereotypical settings, such as church, lessens racial bias (p. 205) as the images are out of synch with prior conceptions. The goal here is to produce images that capture people of color as fully human and shift perceptions in a manner similar to that achieved by gay Americans. Images of success make it harder to maintain a reference for white superiority and to denigrate and de-legitimize those who succeed despite it. In essence, success may indeed be the best revenge.

iv. "Don't be a racist." Bryan, Adams and Monin (2015) found that, when given a chance to anonymously cheat, admonitions to "Don't cheat" were not effective, but admonitions to "Don't be a cheater" reduced cheating to insignificant levels. The "cheater" language makes those so admonished no longer able to dissociate their behavior from their desire to perceive themselves as honest. This research implies, then, that choice of language is critical to successfully challenging the reference for white superiority. Rather than asking whites to change existing policies because they result in racial disparities, saying instead, "Don't be a racist; change the policies," may be more effective.

d. *Engage in random experimentation and rapid evaluation against the new reference for racial equality.* If the new reference and altered perceptions take hold, this magnifies the error experienced from the current situation, and hence the strength of the emotional need to seek change that remedies the problematic situation. Moreover, by creating conflict with the perception of white superiority, this establishes a gradient that increases the chances of actions that increase racial equality being retained, continued and advanced. Random experimentation searches the whole solution space without bias, though with limited resources, intelligent experiment selection and design will still be required.

    i. Alter the least cost stability paths. Stability paths are manifestations in the environment that make it easier to maintain control of it to match existing references. Non-cooperation has the potential to change those pathways by increasing the relative cost of maintaining the behaviors that reinforce existing perceptions and references for white superiority, while smoothing the way for behaviors that would challenge those perceptions and encourage developing a reference for racial equality. In essence, all of the proposals above are likely to impact those least-cost stability paths, but in

addition it will be necessary to do so in ways that de-racialize space.

1. Break open the container. Charles found that the experience of integrated settings at work or the neighborhood significantly reduced negative stereotypes and racial prejudice—another example of the principle of "Fire together, wire together. Out of sync, lose your link" (Adams 2014). Reinvigorated enforcement of fair housing statutes can help break the link between race, residential location and life chances. In this regard, HUD recently issued new rules to increase the integration of neighborhoods by race and class as required by the Fair Housing Act (Housing and Urban Development 2015). Ensuring these new rules are enforced can help break the perceived link between race, poverty and educational and economic outcomes. In addition to improved regulation, the most progressive communities have invested in their capacity to produce affordable housing and have adopted inclusionary zoning practices that ensure that every new development includes housing for the poor, making normal urban and suburban growth processes diminish

rather than increase segregation. At the very least, community plans for development and redevelopment must show the location and design of mixed income, mixed race neighborhoods to increase positive perceptions of the potential attractiveness and desirability of such real estate development when executed well.

2. Restore the wealth of the container. Lenk (2012) describes the process of developing the specification for an econometric model of income determination and finds that even for labor income, income is not a return to work but a return to wealth. The most important wealth is that which is absorbed while growing up as a result of interactions between place, household and individual characteristics. Such wealth includes human and social capital, in addition to financial capital. Preferential public and private investment in the container will be necessary for the foreseeable future to make up for decades of disinvestment and equalize the wealth disparities generating the currently unequal geography of opportunity. For example, MARC's Metropolitan

Transportation Plan (MARC 2015a) calls for aligning transportation investments with policy goals that include increasing equity and place-making, the latter promoting redevelopment in centers along key transportation corridors. Additionally, its Planning Sustainable Places program (MARC 2015b) provides funding for developing the plans necessary to attract private investment in the mixed use, higher density development that can promote greater social as well as economic integration.

ii. Engagement to reconfigure social networks. As Smith observed, we perceive how others perceive us, and act according to our perception of their standard for us. While he advocated that we hold ourselves accountable to the greatest judge within, the impartial spectator, today we more likely pay attention to the judgments of the not-at-all impartial spectators in our social networks. We seek the esteem of those we esteem, to be perceived as valuable by those whom we value. Should the strategies above begin to be successful and some in the majority begin to shift their intrinsic reference to one of racial equality, then it becomes more likely to spread to others in their social network. Pentland (2014) argues that trust is built through

engagement. Thus one key for the reference for racial equality to spread throughout the society is for engagement between members of the majority and minority so their social networks intersect to create the potential for social innovation.

e. *Evolve the higher-level control system necessary to maintain the new reference*. With sufficient engagement, the network shifts from being one consisting of local neighborhoods to one where individuals are connected both more randomly (in that participants have a better chance of being connected no matter what local network they are a part of) and more completely (in that the network more closely approaches one where everyone is connected to everyone else).

    i. Centola and Baronchelli (2015) find that the more completely and/or randomly the network is connected, the quicker it evolves a new convention held by all. Networks that remain only locally connected so some parts are isolated from others never generate new jointly held references however. Thus the more integrated, overlapping and connected the networks are, the more likely they are to evolve a new jointly held reference, i.e., a "prevalent habit of thought." Essentially, a phase shift occurs.

    ii. In Centolla and Baronchelli's model, however, the new convention is randomly selected. Instead, the conflict-generating

non-cooperation strategies described above are designed to create a gradient for such a selection. In the presence of such a gradient, generating the proper social network connectivity and structure should be substantially more likely to result in supplanting the current reference for white superiority with, not a random reference, but a directed one for racial equality.

iii. Note that the process to generate this new reference has required reorganizing perceptions through challenges and counter-framing, and reorganizing actions through experimentation in light of a calling forth of the new reference. As a result, the entire social perceptual control system has been "rewired"—perceptions, references and actions—completing its reorganization as a more sensitive and flexible institution capable of responding to and eliminating the conflicts experienced by minorities as a matter of course. Successfully arriving at this point would mean the social system has, in fact, evolved a higher-level control system that actually resolves, rather than suppresses, racial conflicts.

iv. Note, too, that this process depends upon minorities first calling forth a reference that captures the higher moral ground and then engaging in creating conflict that, if successful, raises everyone to

> that same moral position. Thus whites are raised up too, operating at a higher level of control, one with significantly less wasteful effort to maintain artificial separations, than before the conflict was initiated. Thus, this kind of conflict is ultimately compassionate, not merely antagonistic. While "compassionate conflict" may seem like an oxymoron, the goal all along is not to destroy an enemy but change system structures so that all may better achieve their full potential as human beings.

The strategies above represent a "kitchen sink" approach to creating the kind of non-cooperation needed to conflict with perceptions of white superiority and turn the conflict inward. Unfortunately, the theory developed thus far is insufficiently specific to identify which of the strategies have the highest leverage and greatest potential for success. It remains the case, as Dewey remarked, that "truth can be bought only by the adventure of an experiment" (Dewey, 1922/1988, p. 163). It will take a period of trial and error to determine which strategies are actually most effective, and then continue them until the error between the current reference and one of racial equality is pushed to zero. This is, in fact, the definition of a reorganizing process, but one where those historically at the lowest level of society, minorities, act as the higher-level system defining the intrinsic reference for the entire social perceptual control system.

Such experimentation is likely to be costly. At least some of the cost of trial and error might be avoided if a sufficiently sophisticated simulation model of people and

institutions as composed of hierarchical interacting perceptual control systems were developed that would allow the experiments to be conducted computationally rather than in "real life." While development of such a model was part of the original design for this dissertation, alas, it must be left as topic for future research.

Nonetheless, now may be the time for experimentation. The currently dominant social perceptual control system appears to already be experiencing substantial conflict, not around racial equality but around the national political polarization causing partisan gridlock. The wasteful nature of the conflict is apparent to most, given the rising cost of campaigns for elected office and the degree to which they are funded by a few large contributors (Confessore, Cohen and Yourish, 2015). Meanwhile, the energy and resources expended as a result of political conflict leaves the country vulnerable to outside disturbances—e.g., Eurozone stability, terrorism threats from ISIS, declining Chinese economic growth, Russian aggression in the Ukraine and Syria—because coherent policy or political initiatives can't be mounted to counteract them. The discontent caused by this situation is already causing a search for alternatives, as evidenced by the success that 2016 presidential candidates outside the traditional political establishment are having in early polls.

In the midst of this search and armed with the clearer understanding of minority-directed institutional change derived above, perhaps a steeper gradient in the direction of a reference for greater racial equality can be created. If so, experiments that reduce the error between current perceptions and this reference have a greater likelihood of being

retained and expanded, and evolving the necessary higher-level social perceptual control system to achieve full racial equality can take a few more steps toward realization.

CHAPTER 5

SUMMARY, CONCLUSION AND FUTURE RESEARCH

What we call society is really a giant social perceptual control system and the social force of society is derived from the power of a control system to resist disturbances and eliminate conflict. Not all social interactions are part of a control system, and many that are part of one are voluntary, such as Taylor's protocols. But when conflict is actively avoided or suppressed, when one group has the ability to promote what it needs to thrive at the expense of others' ability to do the same, when the efforts of those other groups are actively resisted, then there is a social perceptual control system in place, whether we acknowledge it or not.

By establishing the perceptual control system as the unit of analysis, what emerges is a powerful theory that clarifies the formation of habit within individuals and the formation of institutions within a society. As such, it is reductionist but not individualistic. It is reductionist in that both individuals and institutions are shown to be composed of the same stuff—hierarchical perceptual control systems—with both habits and institutions formed to bring perceptions of the world into line with purposes. But at their highest and most fundamental levels, those purposes themselves evolved from the history of humans as social species.

Specifically, the addition of Perceptual Control Theory clarifies, unifies and extends several important aspects of Original Institutional Economics:

Clarifications

PCT clarifies nature of Veblen's purposive agents. Agents are composed of a hierarchy of control systems that vary actions as necessary until perceptions of the world match reference conditions defined by their hierarchy of goals. As a result, purpose is achieved by controlling perceptions (inputs), not behaviors (outputs).

All life requires this ability to control perceptions and defend references from environmental disturbances. This helps clarify why sympathy for others was described by Smith as nonetheless stronger for the rich than the poor: Control is necessary for life, and the rich exhibit greater ability to resist environmental disturbances. Extending sympathy to the rich then becomes a means of understanding which perceptions they are controlling in the hopes of learning how to do the same.

PCT also provides a more precise description of what is meant by habit. When Dewey says the essence of habit is in no way repetition but predisposition, this means control systems are designed to repeatedly achieve a goal despite environmental disturbances. When Dewey says habits are arts, this means control systems evolve over time to become finely tuned to their environment so that the achieving most purposes is smooth, automatic and efficient. When Dewey says habits need to be flexible and intelligent, PCT shows how flexibility and intelligence is generated by arranging control systems in a hierarchy where higher levels call forth the perceptions desired by setting the

references for lower levels. Thus, habits are control systems. As said before: We are our habits. We are our control systems. These are equivalent statements.

By clarifying habit, PCT also clarifies institutions as "prevalent habits of thought." The power of institutions to resist change comes not simply from a thought (reference) becoming prevalent in the minds of many, but from being control systems with learned perceptions and organized output functions for transmitting and enforcing those perceptions over both time and space. Moreover, PCT helps clarify how a process of collective control might yield institutions with their own purposes, different from those of any of the individuals that compose them, and hence how a separate social ontological level might emerge.

Unifications

PCT unifies the Veblenian instincts. Both other-regarding instincts, such as workmanship, idle curiosity and parental bent, and self-regarding instincts, such as emulation, predation and self-preservation, are shown to be manifestations of the control necessary for life to exist. This, then, better aligns Veblen with Dewey, who felt that lists of separate instincts simply boiled down to "life is life" since life must act in ways that enable it to survive. Instead, Dewey saw that "life is interruptions and recoveries" with habits (i.e., control systems) performing the function of restoring balance between organism and environment.

In addition, PCT unifies deliberation and habit. Rather than requiring deliberation to run outside of habit in order to tame it, deliberation in PCT utilizes the same hierarchy of

perceptual control systems that define habits, but then runs them in an imagination mode to carry on the required dramatic rehearsals. This is possible because the learned perceptual hierarchy essentially creates a mental model of how the world works. The references called forth by higher levels for lower levels to reproduce are stored perceptions based on memories of what prior actions have previously produced in similar situations. Once the imagination switch is thrown, then, each shift of a high-level reference induces an imagined simulation (dramatic rehearsal) of the consequences of that shift, and those consequences can be evaluated. As a result, the hierarchy of control systems can indeed "stop to think, observe, remember" as Dewey requires for habits to be able to actually know.

Perhaps most importantly, as described above, PCT enables a unification of habit and institution, individual agency and social structure, by positing control systems as the unit that comprises both. This allows a more seamless transition between these two ontological levels and enables a clearer exposition of how each can affect the other.

Extensions

PCT adds to OIE the concept of reorganization of control systems. Like deliberation, reorganization begins with the emotion released when habits/control systems conflict, stopping their normal efficient operation and causing error. Deliberation then requires dramatic rehearsal and evaluation of different lines of reasoning, which necessarily entails higher-level thinking, or what Dewey terms "intelligence." Reorganization's mental requirements are less taxing - random experimentation and selection of those that reduce

the error. As a result, it can occur at all levels of the hierarchy and operate less consciously and more automatically than deliberation. Since, according to Kahneman (2011), the vast majority of our mental activity occurs at these more automatic levels, reorganization is a more general and more widely applicable learning strategy.

Moreover, reorganization's random experimentation can extend beyond actions to evaluate and adjust perceptions and purposes - even at the highest levels of principles and system concepts. As such, reorganization more readily allows for the kind of complete top-down "rewiring" of control systems needed to effect systemic social change and evolve new institutions.

Extensions - Theory of Institutional Change

Most of this work has been an attempt to show how the more general and complete "rewiring" allowed by reorganization and its more precise description of the requirements for occurring can provide a better basis on which to build a theory of minority-directed institutional change.

Reorganization begins when a control system experiences error in maintaining its perceptions of the world sufficiently near its intrinsic references—those necessary for system to survive. In turn, which references those are is determined at the highest levels of the hierarchy.

Typically in PCT, conflicts are resolved by going up a level. It is only at a higher level that the conflict switches from being externalized—where two separate control systems attempt to bring their perceptions of the same environmental variable into alignment with

two competing and incompatible references—to internalized, where a higher goal allows the resetting of the conflicting lower-level references. Reorganization must occur at this higher level to resolve persistent conflicts.

This is a problem, though, if the reference at the highest levels of the hierarchy is what needs to change to eliminate the conflict experienced by lower levels, as is the case for the reference of white superiority. Nonetheless, reorganization allows for evolution of an even higher perceptual level because the current hierarchy is, itself, a product of prior reorganizations.

To achieve such an evolution, awareness of the conflict must first be shifted to the current highest levels of the hierarchy. A variety of non-violent, non-cooperation strategies were discussed that could be employed by minorities to produce this shift without triggering immediate suppression so as to increase the chances of internalization. These include compellingly-told facts, targeted protests, active engagement between minority and majority populations, and increasing the strength of democratic institutions.

Second, minorities must act *as* the higher-level control system they are seeking to evolve and call forth the new reference for racial equality. References are stored perceptions, however, and in the absence of having actually evolved the higher-level social perceptual control system needed, it falls to those seeking greater racial equality to construct the new reference out of words so clear and inspiring ("Black Lives Matter!") as to paint a vivid picture of it in the imaginations of those who hear or read them.

Still, third, the new reference cannot supersede the old one without simultaneously challenging and supplanting the existing perceptions that support it. Strategies discussed to force a reorganization of existing perceptions included naming the existing reference and making it more difficult to avoid being tarnished by its immoral elements, deconstructing the existing frame and developing counter-imagery.

Fourth, as current perceptions soften and allow conflict with the new reference to become more apparent, this opens the door to enhanced experimentation that might modify least cost stability paths in the environment. Particularly important would be the combination of greater regulation of housing markets and greater investment in areas currently experiencing concentrated poverty in order to de-racialize geographic perceptions.

De-racializing space then allows more contact between black and white, rich and poor, majority and minority. This increase in the chances of more random contact can produce a new social network that allows the spontaneous and widespread adoption of new conventions around race, much as "coming out" created greater amounts and greater randomness in the contact between those who are gay and those who are straight, producing new references around gay rights. As the previous steps have the effect of creating a gradient in the direction of a reference for racial equality—an authentic liberty-and-justice frame, to use Feagin's term—the reconfiguration of social networks can lead to this new reference's widespread adoption.

Then, given the new reference, it then becomes easier to produce the array of output functions needed to protect it from environmental disturbances. At that point, a new higher-level social perceptual control system with a reference for racial equality has successfully evolved and minority-directed institutional change has occurred.

Other Insights

Along the way to this theory of minority-directed institutional change, we demonstrate PCT also helps illuminate long-standing issues concerning the interaction between social structure and human agency. PCT explains why the necessity of control most often leads to a hierarchy of perceptual control systems, both within a person and between them. These hierarchies minimize conflict by orthogonalizing the interactions between sub-systems, which is another way of saying control hierarchies maximize sub-system autonomy within the constraint that the system itself survive. In a social perceptual control system, such autonomy is seductive, in that it provides the appearance of significant choice in occupations, technology and social roles while hiding the fact of an overall system purpose set mostly by those with the most power. As such, PCT explains why those who are hurt by the current system aren't in constant revolt and why most of us cooperate so thoroughly with it as to dispute the existence or importance of such larger social purposes.

Yet such hierarchies can lead to stagnation and suppression of conflict, allowing them to build toward explosive crises. The theory developed here contrasts the control benefits of hierarchy with the innovation benefits of democratization and suggests that

institutional evolution can best be thought of as an ebb and flow between these two organizational poles. Democratization allows new social references to evolve, while hierarchy brings greater efficiency in maintaining them…until conditions change and increased democratization must again be called upon to evolve new references.

A side-effect of deriving orthogonalization of activity from control is the beginnings of a control theory of economics. Orthogonalization of activities leads to a hierarchy of social roles that, in turn, produces a hierarchy of social obligations. Such obligations underpin the credit/debt relationships upon which the institution of money is based.

Orthogonalization of activities also leads to specialization in production. Combining specialized production with money allows exchange to be derived as a way to control for meeting multiple needs in spite of that specialization.

That hierarchies evolve to eliminate conflict and achieve the higher-level perceptions needed for organizations to survive leads to a theory of the firm that explains not only the hierarchical structure of most firms' management, but why firms exist at all when, theoretically, the services of employees could instead be purchased one-by-one over open markets.

Production and pricing become acts designed to control firm survival, which may lead to different behaviors than that of pure profit maximization since the rate of growth that maximizes survival rates may not be the maximum rate of growth possible. In particular, there become the possibility of producing "enough" rather than only "more." As

a result, market prices themselves can be viewed as the outcome of collective control processes, which may lead to better predictions of market behavior.

Conclusion

Despite the progress and promise created by including PCT in the OIE toolbox, we end where we began: The world remains a stubbornly difficult thing to change. Veblen's institutions as "prevalent habits of thought" are so prevalent and so habitual that we are (mostly) unaware of how they affect our behaviors. At their most coherent, institutions form ideologies that generate widely held references that are, in turn, defended from disturbances by control systems which operate primarily by generating outputs—studies, media, talking points, contributions to political campaigns, changes in laws—designed to make sure events are perceived in a certain way and interpreted from a certain perspective so as to minimize any perception of error in those references.

From this point of view, minority-directed social change can be viewed as a process of holding up a mirror so we can become aware of the errors our dominant social institutions are inflicting on others and, in so doing, activate Smith's "Impartial Spectator"—which, in PCT terms, resides up a level (or two or three) from the perceptual frame we typically operate out of. Arousing the approbation of this "greatest judge" inside all of us then internalizes the conflict and begins the reorganization process of evolving new references and, with them, new institutions.

For what becomes more apparent from this higher vantage point is that what is at work, not just within people but between them, is a control system. Social outcomes

cannot be viewed as "other," separate from us. They are the workings of the same kind of control systems that are part of us, that we all work hard to create, that we all use every day to achieve our purposes, though mostly unthinkingly. As Kelly (1970) famously put it, "We have met the enemy, and he is us."

As Dewey (1922/1988) said, nothing is closer to us than our habits—they define our character. The same is true for a society. The social control systems in which we participate, that we cooperate with even if we are not aware of them, define our social character. Hence, we are all complicit in the social perceptual control system generating institutional racism. Insofar as we cooperate with it, we are all racists.

Ouch. That hurts. As it should. That's what intrinsic error feels like. A gut-level emotion that something is seriously wrong and we have no choice but to initiate a search for answers to remediate it. It is the impulse that initiates and energizes Dewey's deliberation. It is the internal conflict that triggers Powers' reorganization. Because of the discomfort caused, it is an emotion that is typically suppressed, avoided, or rationalized away. The theory developed here says instead it should be embraced to set forth a torrent of experiments that reorganize our way of thinking and our way of life. As Dewey (1922/1988) also says, "Conflict is the gadfly of thought. It stirs us to observation and memory. It instigates invention. It shocks us out of sheep-like passivity, and … is a *sine qua non* of reflection and ingenuity" (p. 207).

For the goal is an integrated social character where the conflicts experienced by some are not simply shunted aside and ignored simply because their numbers are fewer or

their skin is darker. The goal is for *all* to live a life under control, where it is within their power to attain the purposes that are most important to them. Only in a society with an integrated character is this possible. In light of the "unequal geography of opportunity" documented above, such an integrated character is unlikely without it being integrated spatially as well.

Thus, while much reorganization of society has occurred in the past, there is still more reorganization to occur. A well-organized control system eliminates conflict and reduces intrinsic error to nearly zero. By this definition, U.S. society is not well-organized… yet. Still, it remains mobile enough to evolve the higher-level system required. For this to occur, the intrinsic error experienced by the minority must be directed into the awareness of the majority until it becomes their intrinsic error too. The reorganization-based theory described above is a start at bringing such directional institutional evolution within reach. Hopefully, it has succeeded enough to making the chances for minority-directed institutional change at least somewhat less "vanishingly small." Only time—and the adventure of many more experiments—will tell.

Future Research

The theory derived above is just that, theory. This theory should be examined in more detail against the historical record of social change movements to evaluate the theory's adequacy in accounting for the key factors that explain their success or failure.

As a theory, it brings much into economics that is typically left out, such as perceptions rather than calculations as the basis for behavior, admitting a much wider

range of purposes other than utility and profit-maximization, and recognizing the importance of differential power in setting the references that become both tastes and prices. A control theory of economics would ask what references different types of economic agents hold, what shapes their perceptions as input and what output systems they have at their disposal to maintain them. Such a framework is more likely to yield accurate predictions of the economic behavior humans than one based on defining rationality as equivalent to pure self-interest. Behaving in ways that defend concepts of fairness, reciprocity and altruism aren't irrational—they are the hard won knowledge of the references that minimize conflict in social groups. There is much work to do, however, in specifying the theory fully enough to derive the resulting changes in predicted behavior relative to standard models and their implications for changes in accepted economic and social policy.

Finally, the reductionist though methodologically social nature of the theory developed here begs for the development of an agent-based model that "grows" the formation and evolution of institutions as social hierarchical perceptual control systems from simulated humans that simultaneously are components of those systems and are themselves composed of interpenetrating hierarchical perceptual control systems. Epstein (2006) has called this approach "generative social science." Such a model would then provide a tool to aid deliberation by adding the ability to simulate experiments concerning the best strategies to achieve minority-directed institutional change, rather than only being able to test them by attempting to carry them out in "real life."

Ideally, the hierarchies in such a model would not be explicitly programmed but would emerge out the control needed for survival. A key sub-component of a fully specified model, then, is modelling the formation of perceptions themselves as part of achieving such control. Modelling human-like perception is a subject of much current neuroscientific and machine-learning research that is beyond the scope of this dissertation. It may be, then, that a fully-specified model where perceptions form and evolve to drive hierarchies of perceptual control systems as needed to keep perceptions near intrinsic references will depend upon advances in neuro- and computer science. Nonetheless, progress toward a generative social model based on PCT may still be possible using highly simplified perceptual functions, rather than full-fledged perception models. Indeed, most PCT simulations to date have been conducted using this approach.

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VITA

Franklin Arthur Lenk was born on August 13, 1955 in Fort Monmouth, New Jersey. He attended Shawnee Mission public schools in Johnson County, Kansas, graduating from Shawnee Mission East in 1973 in the top 10 of his class.

Dr. Lenk was admitted to Stanford University in the fall of 1973. His course of studies was influenced by the times, especially the civil rights movement, the riots that followed the assassination of Dr. Martin Luther King and Robert Kennedy, the student protests against the Vietnam War, the impeachment and resignation of Richard Nixon, the 1973 oil embargo and Yom Kippur War. In the language of this dissertation, these conflicts all created intrinsic error for Dr. Lenk and initiated a process of reorganization that continues to this day. At Stanford, the random searching took the form of sampling courses in many disciplines—math, philosophy, religion, astronomy, psychology, law—before settling on economics as the discipline that best integrated scientific methods with the desire and capacity to improve people's live on a social scale. He graduated with a Bachelor's degree in Economics in June, 1978. He continued his studies at Stanford and was awarded a Masters degree in Economics in January, 1979, specializing in econometrics. His Master's thesis analyzed theories of income determination and, in particular, the influence of education on income.

The same month his Master's degree was conferred, Dr. Lenk began work at the Mid-America Regional Council (MARC) as an Economist II. His principal task was to make long-range (20- to 30-year) forecasts of the growth and development of the Kansas City

metropolitan region, both in terms of its total number of people and jobs and their location down to the neighborhood level, a responsibility he continues to perform. He advanced to Economist III in 1982 and Economist IV in 1986. He was promoted to his current position, Director of Research Services, in 1996.

In addition to being responsible for MARC's long-range forecasts, Dr. Lenk has been the principal author of several publications over the years. These include "An Analysis of Metropolitan Kansas City's Office Building Boom" in 1986, "The Economic Impact of the Kansas City Royals and the Kansas City Chiefs" in 1989 and updated in 1992, "Metropolitan Kansas City's Urban Core: What's Occurring, Why It's Important, and What Can We Do" in 1993, "Metro Outlook" in 2001 and "Metro Outlook Live" in 2006. He co-authored with researchers from the Brookings institution, "Prosperity at a Crossroads" in 2014, which analyzed the reasons behind Greater Kansas City's declining economic competitiveness relative to rest of the U.S. in the 2000s compared to the 1990s.

Besides estimating the economic impact of metropolitan Kansas City's professional baseball and football teams, Dr. Lenk has also authored studies assessing the economic impact of expanding the region's principal convention center, a proposed aircraft assembly plant, a proposed Wizard of Oz theme park, recreational sports activities and the region's arts and cultural institutions. Since 1991, he has also been the principle forecaster and author of the annual economic forecast for the region, prepared on behalf of the Greater Kansas City Chamber of Commerce.

In 2009, under contract with the Civic Council of Greater Kansas City, Dr. Lenk teamed up with Dr. Peter Eaton and Dr. Doug Bowles with the Center for Economic Information at the University of Missouri-Kansas City to conduct a four-year study into the nature of income determination, essentially providing the empirical analysis missing from his Master's thesis 30 years earlier. This work resulted in a novel theory income determination, where earned income was viewed as the return to wealth—human capital, social capital and community or neighborhood capital—that is absorbed by individuals as they are growing up, rather than the compensation required to cause someone to choose work over leisure. Using data for the 50 largest metros from the Public Use Microdata Sample of the American Community Survey (ACS PUMS), two different econometric models were developed that enabled precise estimation of the impact of additional years of schooling on income while controlling for race, ethnicity, age, gender and household type. The model included three different effects of education: the number of years, the diploma effect, and the fact that higher levels of education increase the probabilities of entering into a higher-paid occupation.

Since the 1980s, Dr. Lenk has searched for an alternative economic modelling paradigm, at various times exploring chaos theory, systems dynamics and agent-based modelling. When he returned to academia in 2006 at UMKC to obtain his doctorate, it was with the express purpose of developing a social agent-based model that modelled how people really behave, including their many mixed motivations beyond utility maximization. On the surface, this seemed like an oxymoron given the individualist nature of most agent-

based models. The institutional economics that is at the foundation of UMKC's economic program provided much of the required theoretical underpinnings for social agents. It was there that one of his professors, Dr. James Sturgeon, led him to explore the Perceptual Control Theory of William Powers, which seemed to additionally provide the underpinnings for developing agents who, by acting to achieve purposes based on their perceptions, actually acted human.

Developing a theory that integrated these two streams was seen as a first step in producing the desired agent-based model, and that work has resulted in this dissertation. However, the programming required to produce an operational model based on agents with a hierarchy of perceptions and references still remains on Dr. Lenk's "to do" list.