Interdisciplinary Handbook of Perceptual Control Theory, Volume II

Living in the Loop

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Sources and dynamics of the self: Perceptual control theory, psychoanalysis, and the control of self-image

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This chapter is written for two audiences. First, I aim to show psychoanalytically informed readers why Perceptual Control Theory (PCT) belongs in your conceptual toolkit. Most notably, PCT helps clarify what "identification" and "displacement" fundamentally are and how these processes work. Second, I aim to show PCT-informed readers how psychoanalysis helps illuminate certain poorly understood aspects of control and reorganization within PCT. Specifically, it sheds light on the sources and dynamics of "system concept" level perception and the way reorganization in infancy occurs in the context of mother-infant interaction. Both kinds of reader will benefit from the introductory material in the rest of this section, which contextualizes the subject matter of this chapter within a brief overview of PCT.

By "the self," I primarily mean what psychoanalysts call "the ego" but which I will define in PCT terms as the control of self-image at the apex of one's perceptual hierarchy. As we will see, control involves a "reference perception," such as "the superego," an image of the kind of person someone would like to be. The socialization of a boy to be "masculine" like his father is an example of the superego. Another kind of reference perception, which is part of the ego itself, is any model of impulse control originating in infant-mother interactions. "The self" can be defined as the aggregate of control processes involving such reference perceptions at the highest level of anyone's perceptual control hierarchy.

In addition to this verbal definition of the self, I will provide an operational definition that employs the Q-sort procedure, a ranking of personality adjectives to provide a model of the self. To flesh out this operational definition, I will briefly discuss previously published data from a survey that combined a personality Q-sort with a political questionnaire, thus providing separate measures of self-image control and "principle" and "program" level control of political ideology.

In its essence, Perceptual Control Theory explains the structure and dynamics of self-regulating systems, also known as cybernetic or control systems. While a system in general can be defined as any whole having interacting parts (von Bertalanffy, 1968/2015), a self-regulating system is one whose parts interact through a negative feedback loop. The "perceptual" in PCT calls attention to how such systems work—by comparing perception of some variable (e.g., room temperature in the case of a thermostat) with a "reference perception" (e.g., the temperature setting).

Such feedback systems are called negative because their output is driven by the difference between perception and reference perception—the "error signal"—which the system reduces by acting on the environment (e.g., by means of an air conditioner). A "disturbance" (such as an increase in outdoor temperature) gives rise to the error, and the system compensates for the disturbance and reduces the error. When control is complete (when perception matches reference perception), no further action is required. In this state, the air conditioner stops, but the thermostat continues to compare room temperature to the setting, so the process of control is really continuous.

In PCT, such control systems are viewed as modules in a nested hierarchy. The human mind/brain is viewed as such a hierarchy of control modules, with elementary sensory-motor processes at the base and "the self" at the apex. Each module provides reference perceptions to, and receives perceptual input from, the level below it in the hierarchy. Except for the lowest level, which interacts directly with the environment, the other modules act on the environment only through the control hierarchy. PCT has proven highly productive for the investigation of human psychology and behavior, but the exact organization and number of levels in the human perceptual control hierarchy are not settled science.

The Wonder Weeks, a popular baby care book based on PCT, postulates a sequential unfolding of 11 levels of control (10 transitions between levels) that mark infant and toddler cognitive development (Plooij, Plooij, & van de Rijt, 2019). This developmental model of the human control hierarchy has its empirical roots in van de Rijt's and Plooij's ethological and survey research on primate and human mother-infant interactions (Plooij, 2020). In *Behavior: The Control of Perception*, William T. Powers identified nine levels, but acknowledged that his model was tentative; he even raised the possibility that through learning, humans could evolve new levels of perception at the apex (Powers, 1973/2005, pp. 174–175).

Powers and other early PCT researchers constructed their models of hierarchical control from the bottom, up. A typical experiment in this research tradition entails the tracking of moving objects on a computer screen, which fundamentally involves sensory-motor processes in the lowest five levels of the hierarchy.[a] Rooted mainly in such sensory-motor investigations, PCT has more recently been applied to clinical and other topics involving the highest levels of the human control hierarchy. Most notably, the Method of Levels (MOL; Carey, 2006) utilizes a process of introspection, guided by the principles of PCT, to facilitate resolution of internal conflict originating in the upper reaches of an individual's hierarchy (Mansell & Goldstein, 2020), a primary function of what is called in PCT "the reorganization system" (Powers, 1973/2005, pp. 179–204).

In MOL sessions, a person experiencing conflict between control systems at the same level of their hierarchy can typically find creative solutions by "going up a level." For example, indecision at the "program" level about whether to ask for a pay increase may involve a higher-level conflict between principles such as fairness ("I deserve a raise") and security ("I don't want to risk displeasing my boss"). Attending to this conflict consciously may facilitate the emergence of new personal insights and growth, such as the realization that my boss might actually respect me more if I tell him or her that I feel I deserve a raise.

In this example, the internal conflict initially presents itself as indecision at the program level (Powers' level 7), and the sources of the conflict become apparent by "going up a level" to the perception of principles (Powers' level 8). Finally, the creative solution to the conflict emerges by going up one level further to the "system" level, where "the self" determines which principles to uphold and how to negotiate conflicts between them.

The foregoing sets the stage for the subject of this chapter, "Sources and Dynamics of the Self," which mainly concerns the apex (Powers' "system level") of the human perceptual control hierarchy. The following questions bear on this subject. Where do the reference perceptions (ego ideals and models of impulse control) governing this highest level of control come from? What are the sources of self-perception? How does the control of self-image generate reference perceptions for lower levels in the control hierarchy? These are questions about the processes involved, for example, in solving the abovementioned workplace dilemma. In addition, I will consider whether a mode of self-perception that transcends the perceptual control hierarchy and the reorganization system is possible, and if so, what that would look like.

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a. To be sure, higher levels may come into play in such research. For example, a subject doing a tracking task could choose to deliberately disregard the researcher's instructions and "mess up" the experiment. But even if such rare events occur, it is not part of the experimental agenda to explain them, except to note in passing and in general that human subjects exhibit higher levels of control than those under investigation in the tracking task.

For purposes of this chapter, I will be drawing on a unique data set involving a survey of personality and belief systems (D'Agostino, 1995). The survey consisted of a personality Q-sort (explained below) and a separate political questionnaire including "hawk" and "dove" beliefs and policy preferences. As we will see, the Q-sort provided a model of the self and the questionnaire provided a measure of political ideology that can be situated at the principle and program levels of the PCT hierarchy.

PCT, psychoanalysis, and sources of the self

A suitable starting point for the current inquiry is William Powers' speculations about where reference perceptions at the apex of the human control hierarchy come from. In *Behavior: The Control of Perception* (Chapter 13), he suggests that one of these sources is "instinct" and another is memory, which correspond to "intrinsic" and "learned" reference perceptions (Powers, 1973/2005, pp. 174–175). Though Powers does not refer to psychoanalysis in this context, these are essentially the same two sources of the self that Freud identified.

In the terminology of classical psychoanalysis, the first of these factors is called "drives" or "the id." Examples include genetically programmed bodily needs such as eating, drinking, and waste elimination. The second factor—memory—is built up from the infant's interaction with their environment, encompassing the psychoanalytic concepts of the "reality principle" and the "the ego." While the infant's generalized sensory-motor capacities unfold with milestones in her brain development (Plooij, 2020), her expanding repertoire of specific reference perceptions is constructed from memories of the pleasant or unpleasant consequences of actions.

The reality principle pertains to the environment in its impersonal aspect, but the infant initially experiences the environment mainly in the form of his mother's body. As the child develops, and explores his environment in an increasingly autonomous manner, interaction with the parents continues to shape his experience decisively. These interactions, according to psychoanalysis, are at the core of personality development. The self, which Freud called "the ego," emerges from the id/environment interaction, including the impersonal (reality principle) as well as personal aspects of the environment.

While humans have both instincts and memory in common with other animals, the pre-eminence of culture for humans transforms the operation of these faculties. Human offspring are unique in the long duration of their dependence on adults to provide for their nutrition, hygiene, and other needs. Beginning with these earliest child-parent interactions, a developing child is socialized according to the norms of their culture as mediated by their parents.

Conceptualizing human psychology in bodily terms, early psychoanalysis focused on parent-child interactions related to feeding and waste elimination, and in later development, sexuality. Many researchers informed by psychoanalysis subsequently came to see the relational needs and capacities of children as at least as fundamental as bodily needs.[b] John Bowlby (1951), building on research by ethologists on "imprinting" in birds and mammals, hypothesized that human infants also have an "attachment" drive, that is, an innate need to control physical contact with their mothers. (By "mother," I mean in this context the primary infant care provider, whether or not this person is the biological mother.)

Harlow's (1958) maternal separation experiments with rhesus monkeys showed that primate infants need such physical contact, not only feeding (Association for Psychological Science, 2018); this constitutes experimental evidence for Bowlby's attachment theory. Subsequent research (Ainsworth & Bowlby, 1965; Bowlby, 1969/1999; Fonagy, 2001; Stern, 1985) has established the importance of infants' relational needs in psychological development and of relational trauma in the etiology of psychopathology.

While attachment begins as the control of physical contact, the infant-mother bond is so emotionally charged that its security or insecurity has life-long implications for someone's capacity to give and receive love (Fonagy, Lorenzini, Campbell, & Luyten, 2014; Fraley, 2018). Freud's concept of libido, which included but was not limited to the sexual drive, arguably encompassed what Bowlby and others later called "attachment" (Pederson, 2015). Although not using attachment terminology, Plooij makes a contribution to this literature by examining how the disorienting transitions between stages of early brain development impact child-mother attachment dynamics (Plooij, 2020).

Meanwhile, psychoanalysis after Freud increasingly focused on relationality, consistent with the findings of attachment researchers. "Object relations" psychoanalysts, particularly Ronald Fairbairn and Donald Winnicott, placed the relational needs of humans and relational trauma at the center of clinical theory, practice, and research (Celani, 2010; Kavaler-Adler, 2019). In addition, many psychoanalysts who do not use object relations terminology have reached essentially the same conclusions, most notably Heinz Kohut, who called his approach "self psychology" (Strozier, 2004).

In summary, both PCT and psychoanalysis conceptualize development of the self as occurring at the intersection of nature and nurture, a theory of personality that for psychoanalysts today emphasizes the innate relational needs and capacities of children and the ways that parents respond or fail to respond to them. Powers' concepts of intrinsic and learned reference perceptions links self-psychology to control systems theory. Plooij adds stages of brain development as a key innate factor driving early childhood development.

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b. Pederson (2015) argues that this relational focus was already salient in Freud and that subsequent criticisms of him as being primarily a drive theorist neglect this fact. In Freud's thought, according to Pederson, the relationality of humans is inseparable from the "object seeking" that is inherent in drives, and libido is fundamentally a principle of relationality, of which the sexual drive is only a special case.

There is more to say about the intersection of PCT and psychoanalysis, which will be addressed in the following two sections. For now, it should be noted that the self as ego can be viewed as the first of three strata of subjectivity. In PCT terms, this first stratum corresponds to the control of self-image, which we assume occurs at the highest level of the human control hierarchy. A second and broader stratum of subjectivity includes the control of self-image but also encompasses the individual's entire "stream of consciousness," which is associated with the whole brain, control hierarchy, and body.[c] From a PCT perspective, this second stratum of subjectivity may correspond to what Powers called the "reorganization system" (Powers, 1973/2005, pp. 179–204).

Finally, subjectivity encompasses what has been called "mystical experience" (Andresen & Forman, 2001; Forman, 1999) and "higher states of consciousness" (Cvetkovic & Cosic, 2011; Travis, 2021). At this third stratum, a person experiences herself as not limited to her individual personality or body but as including "pure consciousness," a mental state having distinct neurophysiological markers (Travis & Pearson, 2000; Travis, Tecce, Arenander, & Keith Wallace, 2002). We will return to this topic in the final section, when we consider whether humans can evolve a mode of perception that transcends what Powers called the system level, and the reorganization system. For the most part, however, we will be concerned in this chapter with the first of the above-mentioned strata of subjectivity: the ego as control of self-image.

Self-perception, machismo and militarism

To illustrate how PCT and psychoanalysis can inform empirical research on the control of self-image, I will briefly review my own published study of self-perception and militarism (D'Agostino, 1995, 2019). Foreign policy "hawks" can be defined as people who support high levels of military spending and the frequent threat or use of force in international relations. To identify such people, I created a militarism scale consisting of 25 hawk and dove statements (evaluated on a nine-point Likert scale). I then obtained a total militarism score (with dove statements scored negatively) from each survey respondent, and selected persons with the highest militarism scores as "specimens" of hawks (Runkel, 1990).

To assess personality independently of political beliefs and policy preferences, I used the self-assessment version of Jack Block's California

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c. A person's body as they perceive it is conterminous with the entire perceptual control hierarchy. It appears that sensory and proprioceptive perception of the body occurs at lower levels of the hierarchy alongside perception of physical constructs in the environment. At the apex of the control hierarchy (the system level), a person may perceive their body as an interacting aggregate of abstract entities such as organs, cells, and molecules and also as part of their self-image, as when someone says "I feel good about my body." Similarly, at the principle level, someone might say, "I need to lose weight," and at the program level might perceive the effects of diet and exercise on achieving their desired weight.

Q-set, slightly modified to accommodate psychological theories of militarism (Block, 1961/1978; D'Agostino, 1995, Table VI). Each respondent was asked to describe his or her own self by ranking this list of 72 personality adjectives from "least characteristic of you" to "most characteristic of you." Each person's rankings, recorded in a bell-shaped template called a Q-sort, represents their self-system. A composite Q-sort of the hawk specimens, identified as hawks by their high scores on the militarism political and policy scale, represents a pattern of self-perception that these respondents have in common, shown in Fig. 1. For a discussion of some methodological issues involved in this research, please refer to the Technical Appendix.

In exploring this data set, some personality traits that predicted hawk policy preferences (as indicated by bivariate correlations) were found to be identical or similar to items in the Bem Sex Role Inventory (Bem, 1974), a list of stereotypically "masculine" and "feminine" traits. However, this "machismo" construct (where the "feminine" traits were scored negatively) only predicted militarism scores for males, and specifically for white males. A second set of personality traits that can be labeled "authoritarianism" also predicted militarism scores for white males. In the interests of brevity, I will only discuss here the machismo findings from the male subsample ($n = 328$); for a more thorough discussion of these survey data informed by psychoanalysis and PCT, see D'Agostino (2019).

How, then, does the white male hawk personality type in Fig. 1, obtained empirically using Q-sorts and a policy questionnaire, contribute to an understanding of militarism? First, I make no assumption that the latter can be reduced to the psychology of individuals. There is clearly a war system consisting of heavily armed states and permanent war economies, and militarist ideology is largely an adjunct and epiphenomenon of this large-scale system.

At the same time, however, the war system depends upon militarist ideology for its legitimation and many leaders and ordinary citizens question such ideas. This divergence in political beliefs between hawks and doves merits some explanation, and also holds out hope that changes in individual psychology can eventually help demilitarize international relations. With this assurance that individual differences matter in the larger context of militarism, we turn now to the profile in Fig. 1, a composite Q-sort of white male subjects who held hawk policy preferences.

As with any empirical findings, Fig. 1 can only be understood in the context of relevant theory. Informed by the personality literature in political psychology (D'Agostino, 1995, Table VI), my research hypothesis was that self-psychology would help explain hawk and dove beliefs and policy preferences, and I designed the survey to test this general hypothesis. However, the research was exploratory in the sense that I did not know in advance exactly which personality variables would be involved or exactly how self-psychology manifests itself as support for or opposition to militarist ideology. Only after collecting the data did answers to these questions begin to emerge, with the help of an innovative conceptual framework combining PCT and psychoanalysis.

Use the following list of adjectives to describe yourself as honestly as possible. Record the numbers of the adjectives in the bell-shaped set of columns below.

First, check off the *two* adjectives that are *most characteristic* of you, record them in column 14, and cross them off the list. Of the remaining adjectives, check off the next two that are most characteristic, record them in column 13, and cross them off. Follow this procedure until column 8 has been completed. Note that the columns closer to the middle contain an increasing number of items, as indicated above the columns.

When you finish column 8, record the items that are *least* characteristic of you, beginning with column 1 and working toward the middle.

You must remember to cross off each item after you record it in order to avoid recording the same item more then once.

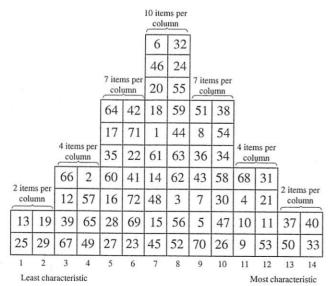|			
1 . absent-minded	19. dull	37. persevering	55. strict
2. affected	20. easily embarrassed	38. personally charming	56. stubborn
3. aggressive	21. energetic	39. feel powerless	57. submissive
4. ambitious	22. envious	40. reasonable	58. sympathetic
5. assertive	23. erotic	41. rebellious	59. tender
6. bossy	24. extroverted	42. resentful	60. timid
7. calm	25. feminine	43. reserved, dignified	61. touchy, irritable
8. cautious	26. frank	44. restless	62. tough
9. competitive	27. grandiose	45. sarcastic	63. unconventional
10. confident	28. guileful	46. selfish	64. undecided, confused
11 . considerate	29. hostile	47. self-controlled	65. unhappy
12. contemptuous	30. idealistic	48. self-indulgent	66. uninterested, indifferent
13. cruel, mean	31. imaginative	49. self-pitying	67. feel unworthy, inadequate
14. cynical	32. impulsive	50. sense of humor	68. versatile
15. defensive	33. intelligent	51. sentimental	69. feel vulnerable
16. dependent	34 . introspective	52. shrewd, clever	70. warm
17. disorderly	35. jealous	53. sincere	71. withdrawn
18. dissatisfied	36. masculine	54. sophisticated	72. worried and anxious

FIG. 1   Q-sort instrument showing composite self system of white male hawks.

The result that I found most striking and especially wanted to understand is why male hawk subjects typically placed the word "feminine" (item # 25) in the most extreme "not characteristic of you" tail of their Q-sorts, second only to "cruel and mean" (item #13).[d] Male doves by contrast, placed "feminine" much closer to the neutral center of the distribution, indicating a more androgynous self-system. To make sense of this pattern, I turned to a classic study of psychoanalysis and the sociology of gender (Chodorow, 1978). This provided a theoretical framework, discussed below, that sheds light on the psychology of male hawks and suggests dynamics of perceptual control that may be operating in these subjects.[e]

In light of psychoanalysis and the sociology of gender, it is plausible to assume that a man placing "feminine" in the extreme negative tail of his Q-sort is controlling an image of himself as "not feminine." Origin of this "not feminine" reference perception seems straightforward, given that the subjects (Americans surveyed in 1990) are products of a culture that socializes children into stereotypic gender roles. Most males in such a culture are socialized to be "not feminine," making it predictable that so many learn to control this aspect of their self-image. What is less obvious and needs to be explained is why white male doves *do not* control this aspect of their self-image, as indicated by their Q-sorts. We will return to this question near the end of this section.

As with any control system, a reference perception is compared with perception. To understand the self-perception component of the "not feminine" control system, consider that infant care in cultures that practice sex stereotyping is assigned to females.[f] Further, infants generally identify with their care providers and internalize this identification as part of their own self-images. This phenomenon, which is an axiom of object relations psychoanalysis that is suggested by abundant clinical evidence (Celani, 2010; Fonagy, 2001; Kavaler-Adler, 2019; Pederson, 2015; Strozier, 2004), will be discussed in the following section. Suffice it to say here that any male or female whose earliest memories include being nurtured by a female will have an "inner feminine." With gender socialization later in childhood, however, the psychology of females and males diverges. While girls are socialized to embrace their inner feminine (Chodorow, 1978), boys are socialized to renounce this aspect of themselves (Pederson, 2015; Tacey, 1997).

d. While I frequently refer to male hawks, it should also be noted that these respondents were overwhelmingly Caucasians from the United States. These cultural characteristics of the sample may limit the generality of the findings reported here, a question meriting further study.

e. We cannot infer from an individual's Q-sort exactly what self-perceptions he or she is controlling, as explained in the Technical Appendix. What needs to be explained, however, is not the unique self-system of any individual, but the differences in self-perception reported by male hawks and doves. It is this pattern in the data as a whole that psychoanalysis and the sociology of gender help explain.

f. Such sex typing is widespread but not universal; to take one notable counterexample, Aka Pygmy fathers are very nearly equally involved in infant care as are mothers (Hewlett, 1993).

The upshot of these social and psychological processes is that many males raised in cultures that practice sex-stereotyping experience chronic gender insecurity. Their "inner feminine" is necessarily a deep and permanent feature of the self. Later sex role socialization, however, tells a male that he needs to renounce this aspect of himself in order to be a "real man." In PCT terms, such gender insecurity can be described as a control system in a chronic error state. The gender insecure man experiences an inescapable discrepancy between a "not-feminine" reference perception—inherited from his stereotypic gender socialization—and self-perception of his "inner feminine," inherited from earliest identification with his mother.

What are the implications of such chronic discrepancy? First, a man trapped in this inner conflict will experience the error signal of his "not-feminine" control system as self-doubt about his manhood. The output of the control system is accordingly a chronic behavioral disposition to "prove my manhood." This can motivate a range of actions from driving a loud motorcycle or getting into fist-fights to playing competitive games in politics, the corporate world, academia, or professional sports. Apropos militarism, this repertoire could include voting for hawkish political candidates who promise to shore up the nation's perceived virility.

None of these actions, however, can provide lasting relief from gender insecurity. The reason is that they do not and cannot silence a man's "inner feminine," which continues to haunt him because it is a fundamental constituent of his self, rooted in his internalized mother images. Returning to PCT, the chronic error is like that of an air-cooling system stuck in the "on" state because an open window is letting hot air into the room, canceling the effects of the air conditioner. If such a system does manage to achieve control, it does so only briefly before returning to the error state, which generally persists. In this analogy, the mother images are like the hot air coming in from a window, continually preventing the man from achieving a stable image of himself as "not-feminine."

This brings us to an apparent paradox regarding the white male hawk Q-sort. If such a male is in fact unable to escape the self-perception of being "feminine," at least as regards part of his psyche, what does he have in mind by placing this trait in the "least characteristic" tail of the Q-sort? This is a question that should be posed to the subjects themselves, and different people will no doubt have different answers. In general, however, a subject who completes a Q-sort and talks about it to the researcher, even assuming he or she is completely sincere and honest, does not necessarily exhibit reliable self-knowledge. A macho man who claims to be "not feminine" may have persuaded himself and others of this because he frequently exhibits macho conduct. Such outward expressions of machismo, however, are entirely consistent with unconsciousness of the gender insecurity that motivates them.

It is especially plausible in this instance that self-perception will be unconscious because identification with the mother originates in early childhood, a set of memories that most adults can access only imperfectly if at all. The way

Q-sorting uncovered the not-feminine control system in the present research underscores the power of this technique in general to reveal important features of self-psychology, even where the sources of these features are unconscious. Q-sorting is an operation, and it faithfully models what a person is controlling, whether or not the sources of the action are accessible to consciousness.[g]

We turn now to the question whether placement of the item "feminine" in the extreme negative tail of the composite Q-sort really indicates a single control system in a chronic error state. Because of limitations of space, I will only consider one alternative explanation here, namely that a person might inherit conflicting gender ideals from his mother and father, and experience internal conflict between "being feminine like mom" and "being masculine like dad." I believe this theory can be ruled out by the questionnaire data, which pertain to the principle and program levels. According to PCT, conflict between control systems at the level of the self would manifest itself as vacillation or indecision at these lower levels, as in the above-mentioned case of a person who cannot decide whether to ask for a pay raise. While subjects near the middle of the political and policy continuum do exhibit this kind of ambivalent mix of hawk and dove beliefs, most survey respondents do not.

The questionnaire data as a whole contain a bipolar hawk-dove factor, as verified by a principal components analysis. The conflicting control system explanation cannot account for the hawk and dove ends of this continuum, while the machismo-androgyny hypothesis presented here can account for the entire continuum. This is obvious in the case of macho male hawk survey respondents, as explained above, and we will now see how it applies more generally. The question that must be answered is this: if a sex-stereotyping culture socializes all males to renounce their "inner feminine," why do many males exhibit an androgynous ego ideal? To address this question, we need to consider the long-term consequences of the chronic inner conflict to which sex stereotyping subjects males.[h]

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g. At the same time, however, every person's control hierarchy is unique and a researcher cannot make reliable inferences about what an individual is controlling entirely from his or her Q-sort. Such methodological problems are discussed in the Technical Appendix.
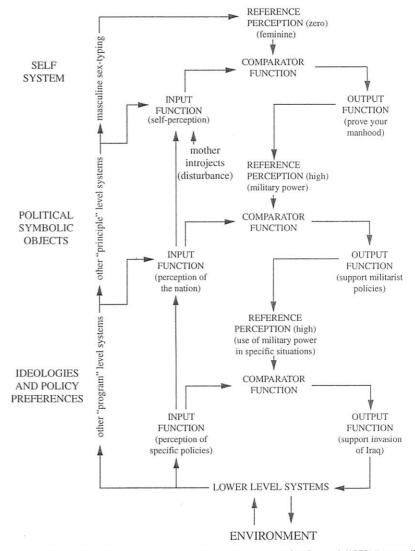
h. The extent of androgyny in modern cultures probably cannot be explained entirely by variations in parenting styles and in the gender ideologies of families. As long as infant care is delegated overwhelmingly to women, one would expect the resulting gender psychology identified by Chodorow to describe the overwhelming majority of cases; the emergence and existence of modern androgynous family subcultures is therefore itself part of what needs to be explained. Reorganization due to the internal contradiction of the machismo syndrome, described below, might help explain this emergence and existence of psychological androgyny in sex-stereotyping cultures. By contrast, one would expect people of both sexes to be naturally androgynous in a culture in which fathers are almost equally involved as mothers in the care of infants, such as the Aka Pygmies (Hewlett, 1993).

We have already discussed the compensatory machismo produced in the short term by the "not-feminine" control system. Because it takes the form of chronic internal conflict, an aversive error state analogous to pain, this same control system also motivates learning and reorganization in the long term. A female-raised man cannot banish his internalized mother images, but he *can* reconsider the arbitrary dictates of his gender socialization, which is the only way to escape his inner conflict. When a gender socialized male comes to see his "not feminine" ego ideal as the source of his distress, he becomes free to reject it, and adopt in its place an androgynous ego ideal that is compatible with his inner feminine.[i] Again, this process can be understood in PCT terms as reorganization (Powers, 1973/2005, pp. 179–204).

Such reorganization would help explain why so many men, in fact, exhibit psychological androgyny instead of the not-feminine control system. (All usage of the term "androgyny" in this chapter refers to psychological androgyny.) It can also account for politically ambivalent subjects near the center of the hawk-dove continuum; reorganization is a process, and we would expect intermediate forms between an entrenched "not feminine" control system and the absence of such control found in androgynous males.

While this topic requires further research, it should be noted that androgyny is not an ad hoc explanation for the existence of white male doves. In fact, an entire school of psychoanalysis—Jungian Analytical Psychology—considers androgyny the key to psychological development and wholeness (Tacey, 1997; Wehr, 2016). Starting with a Freudian framework, Pederson (2015) reaches similar conclusions. The psychology of militarism research outlined here makes a PCT-informed, empirical contribution to these developments in psychoanalysis.[j]

Finally, in conjunction with the empirical findings outlined here, PCT sheds light on what psychoanalysts call "displacement," the symbolic transfer of feelings and ideas originating in childhood experience to some other context. Fig. 2 depicts this for the case of white male hawks, where gender insecurity at the level of the self is displaced onto the nation and its military power (principle level perceptions), and onto national security policy issues (program level

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i. This is not to say that awareness alone is enough to achieve wholeness. Relational trauma have enduring effects on the brain, including an elaboration of limbic/brainstem circuitry that must be unlearned and replaced with limbic/frontal-cortical circuitry (Travis, 2015). The concluding section examines the role of meditation in facilitating such neural reorganization.

j. Identification with and projection of internalized mother images (and related unconscious complexes) presumably occur universally, but in the course of healthy development are increasingly superseded by individuation. The latter must be distinguished from renunciation of the inner feminine due to sex typing, which does not produce individuation but rather the machismo complex, a kind of negative identification. Genuine individuation occurs when a man recognizes his internalized mother images and other previously unconscious contents as separate from the ego but part of his self, construed more broadly to include both conscious and unconscious elements of the personality.

[The three levels in this figure, beginning at the top, correspond to Powers' (1973) "system," "principle," and "program" levels.]

FIG. 2 A hierarchical PCT model showing displacement of machismo onto the nation and its military power.

perceptions). Here, military power and hawk policies becomes symbolic surrogates for manliness. This displacement can be conceptualized as a linkage between a white male hawk's "not feminine" control system and political and policy control systems below it in the hierarchy, as illustrated in Fig. 2.[k]

In this brief overview, I have only outlined one aspect of the psychology of militarism, the machismo of white male hawks, and only on the basis of data collected in the United States in 1990. That same survey also found that most white male hawks exhibit "authoritarian" self-images; these data and a specific form of identification that can account for them were discussed in D'Agostino (2019). This topic, which psychoanalysts call "identification with the aggressor," will be discussed in the next section in the context of a general theory of personality development.

Identification and personality development: "Mastery through reversal of voice"

As noted near the beginning of this chapter, psychoanalysis construes the ego as developing from interactions between the id and the environment. These "nature and nurture" sources overlap with the PCT concepts of intrinsic and learned reference perceptions. We have also just seen that "displacement" in psychoanalysis can be explained as the linkage between self-perception control modules and lower-level modules involving perception of symbolic objects, such as the nation and its military power. To take another example, consider how a child invests a doll with symbolic meaning by displacing his or her self-system dynamics onto it.

We turn now to another psychoanalytic concept, identification,[l] which we previously encountered in the form of mother identification in the context of machismo psychodynamics. In this section we will explore additional examples and conclude with the centrality of identification for a general theory of personality development. Specifically, we will see how the psychoanalytic concept

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k. As explained in the Technical Appendix, the nexus between male gender insecurity and hawk beliefs and policy preferences is a statistical pattern found in a survey sample. Theoretical considerations (Bem, 1974; Chodorow, 1978) suggest this pattern probably occurs more widely in the population (just how widely is a question for further research), but I am certainly not claiming that all male hawks are motivated by gender insecurity. Militarism no doubt has diverse causes, including other personality factors such as authoritarianism (discussed in the next section). On another level of explanation, militarism arises from the conscious accommodation of policy elites to powerful special interests, such as defense contractors and military bureaucracies, and to the effects of militarist propaganda on the mass public.

l. There is much overlap in terminology among psychoanalysts involving the terms "introjection," "identification" and "internalization" (Celani, 2010; Fonagy, 2001; Kavaler-Adler, 2019; Pederson, 2015; Strozier, 2004). The subtle meanings of these different terms are beyond the scope of this introductory presentation, in which I use "identification" somewhat loosely to refer to all phenomena involving what Loevinger (1966) called "mastery through reversal of voice." The examples in this section are hypothetical, but similar case material is found throughout the above-listed sources.

"mastery through reversal of voice" provides a top-down principle of personality development that complements Plooij's (2020) bottom-up account of cognitive development. (I am using "top-down" and "bottom up" with reference to the perceptual control hierarchy.)

By identification, psychoanalysts mean the internalization of images of another person (most notably one's parent or early care provider) such that these images are experienced as part of oneself. Consider an infant who is not hungry but is crying for some other reason. Whenever this happens, her mother frequently picks her up, hugs her, and tries to comfort her. This child will internalize an image of her mother as a comforter, and this internalized image will become part of her self. Experiences of distress in adulthood will automatically conjure up these mother images—the person's "inner comforter"—and she will typically navigate these experiences with resilience and inner strength. She may not be able to recall specific memories from infancy of being comforted by her mother, but these experiences will have given her the inner resources to comfort herself in times of distress.

Now consider a hypothetical example of identification with a very different outcome. In this case, the infant who cries is immediately given a bottle. Instead of learning to comfort herself without food or drink, this person as an adult will be at risk of stress eating or drinking. She may not remember experiences of her mother putting a bottle into her mouth when she was crying, but she may "instinctively" reach for food or alcohol during periods of distress. In reality, of course, this way of coping with stress is not instinctive but learned. Specifically, it is a pattern of infant-parent interaction that is internalized and incorporated into the ego. In adulthood, the inner bottle provider, which originated as memories of mother, will be experienced as part of oneself, the part that engages in stress eating or drinking.

Identification relates to the PCT concept of reorganization, which explains how control hierarchies are learned and how organisms navigate conflicts within their hierarchies (Powers, 1973/2005, pp. 179–204). On this point, Powers had a somewhat different view of infant development than Plooij (2020), who notes that physical growth spurts of the infant brain appear to be correlated with the sequential emergence of levels of control. Plooij (2020) takes this as evidence that the levels of the human control hierarchy are in some sense genetically inherited. Powers, however, consistent with recent neuroscience theory by Ellis and Solms (2018), cautioned against attributing cognitive/behavioral structures to genes.

What is genetically inherited, according to Powers (1973/2005), pp. 179–204), is "the reorganization system," a generalized capacity to satisfy intrinsic reference perceptions by building a learned perceptual control hierarchy. Psychoanalysis adds to this picture a description of how infants learn new control systems in the context of interaction with their care provider(s). Most notably, when an infant cries (a generalized expression of intrinsic error), the way his or her mother responds will become an internalized template for control

systems that the developing infant will later enact on his or her own, which we will see exemplifies mastery through reversal of voice.[m]

Identification is a powerful explanatory concept for understanding sources and dynamics of the self, and can take many forms. One particularly important form, which psychoanalysts call "identification with the aggressor" (Frankel, 2002), is illustrated by the following example. Consider a person subjected to corporal punishment as a boy, say, at the hands of his father. The threat of physical harm undoubtedly triggers the boy's innate fight/flight system, and concomitant emotions of anger and fear, but neither fighting nor fleeing is a viable option in this situation.

Instead, the child learns to suppress or disregard his own emotions in the service of an adaptive strategy for managing the threat. He imaginatively puts himself into his father's mindset to find out what he wants, to mitigate his father's anger, to pacify him by complying with his wishes, and to thereby cope with and survive the immediate threat. At this stage of internalization, the father is experienced as an external threat, and identification with his mindset is a heuristic strategy in the service of managing the threat. A single experience of this kind is generally traumatic; with repetition of the abuse, the trauma is compounded and identification with the aggressor becomes a habit of mind.

From a PCT perspective, these dynamics have all the hallmarks of conflict between control systems. On the one hand, attachment to the parent (both the primary attachment figure of infancy and secondary attachment figures of later development) is a lifeline for any child—a source of protection, love, and resources needed for survival. On the other hand, this same attachment figure is now himself a threat to be avoided, and is activating the child's fight/flight system, which evolved to manage mortal threats posed by predators (Ellis & Solms, 2018).

In such a situation, some system that is not itself part of the perceptual control hierarchy must adjudicate the conflict, in this case, between contradictory images of the father as someone to approach and to be avoided. In PCT, the reorganization system (Powers, 1973/2005, pp. 179–204) plays this role; identification with the aggressor can thus be viewed as a specific form of reorganization that enables the boy to creatively resolve this approach/avoidance conflict.

Traumatic memories of such abuse consist of two parts—the inner child with his suppressed or dissociated anger, fear, and humiliation, and the inner

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m. While psychoanalysts focus on how infants internalize their patterns of interaction with care providers, the interactions themselves raise a separate set of questions. From a PCT perspective, mother-infant interaction is a special case of collective control and communication, a topic explored by McClelland (2020) and Taylor (2020) for the case of adult interaction. Plooij (2020) examined a specific pattern of infant-mother attachment dynamics in chimpanzees and humans. For a review of research on synchronization of behavior, affective states, and physiology in human infant-mother dyads, see Middlemiss, Granger, Goldberg, and Nathans (2012).

aggressor who may also be angry but is unafraid and free to express and act upon his feelings. Many years later, long after the period of actual abuse has ended, the survivor continues to wrestle with these traumatic memories. While it is typically too stressful to confront the emotional turmoil of the inner child, the survivor finds a kind of pseudo relief from the trauma by adopting the inner aggressor's mindset as his own. Instead of feeling fearful and powerless as he did when getting beaten by his father, the person now feels powerful, as his father did when committing the abuse.

Identification with the aggressor begins as an adaptive strategy in the immediate situation of child abuse and ends up as an internalized defense against painful traumatic memories. The abuser can be the father, mother or someone else; the victim can be a boy or a girl; and the abuse can be physical beating, sexual violation, or something else. Regardless of these variations, the child suppresses or dissociates her own feelings, identifies with the aggressor's, and later adopts the aggressor's feelings as her own (Frankel, 2002).

Identification with the aggressor in its corporal punishment version is highly relevant in political psychology, especially for understanding why so many people endorse militarism and abusive policing. As with the displacement of gender insecurity and machismo onto the nation and its military power, discussed above, it appears that unconscious complexes involving corporal punishment are displaced onto political symbolic objects. A man who identifies with his abusive parent tends to displace this complex onto the agencies of government that use force, while displacing his traumatized inner child onto political scapegoats such as foreigners or criminals (D'Agostino, 2019).

This nexus between corporal punishment and right-wing political attitudes has been documented by a robust body of survey research since the 1990s (Milburn & Conrad, 2016; O'Keefe, 2018). White male survivors of childhood corporal punishment are more likely than others to support state violence, except survivors who undergo psychotherapy, which enables them to process their anger rather than displace it onto scapegoats. Female survivors of corporal punishment also exhibit identification with the aggressor, but compared with white males are more typically socialized to displace their anger onto themselves than onto political scapegoats (Miller, 1986). Mothers who were mistreated as children are also predisposed to mistreat their own children (Armfield et al., 2021). Black male survivors in the United States more typically displace their anger onto one another than onto out-group political scapegoats (Milburn & Conrad, 2016). These cultural variations may help explain why the hawk self-system is most prevalent among white males. However, militarist ideology (a set of principle and program level reference perceptions) can be communicated from fathers to daughters, not only to sons.

The psychology of militarism research discussed previously yielded findings relevant to authoritarianism, including control of self-image involving identification with the aggressor. These findings and related clinical implications are beyond the scope of this chapter but are discussed in a separate article

(D'Agostino, 2019). The point to be noted here is that corporal punishment survivors who experience psychotherapy are less likely than untreated survivors to enact political aggression and scapegoating (Milburn & Conrad, 2016). This finding provides hope for individual and collective healing.

We conclude this section with some implications of the foregoing for a general theory of personality development. In discussing the topic of identification, we have mostly focused on the role of relational trauma in the etiology of psychopathology. However, one example—identification with the maternal comforter during times of stress—illustrates a benign variation. In general, identification is a normal part of development, and appears to become pathogenic only when the internalized parent-child interaction is characterized by relational trauma. This topic has been explored extensively by object relations theorists such as Ronald Fairbairn and Donald Winnicott, as well as others who place relationality and relational trauma at the center of clinical theory including Heinz Kohut and Freudian psychotherapist and theorist Trevor Pederson.

The fundamental mechanism involved in identification, regardless of the quality of child-parent interactions that are internalized, is a psychoanalytic principle called "mastery through reversal of voice" (Loevinger, 1966). According to this principle, humans learn to recapitulate in the active voice what they previously experienced passively in infancy and childhood. The child who was comforted learns to comfort himself and others. Likewise, the one who was abused learns to identify with his abuser and abuse others, practice self-harm, or target vulnerable outgroups for political scapegoating, unless these dynamics are upended by healing.

These psychoanalytic insights complement PCT research by Plooij (2020) and others on how control systems come into existence—research that has mostly addressed control processes lower than the system level and have built up explanations from the bottom, up. Mastery through reversal of voice can provide a complementary, "top-down" theory centered on how children construct their self-perceptions by learning to control internalized parental images ("top-down" in the PCT sense). The examples outlined here illustrate this theory and may provide new insights for PCT researchers working in clinical and related domains.

Plooij (2020) describes a sequence of distinct stages in early childhood development—sub-stages of what Piaget called the sensory motor stage—that build up the hierarchy of perceptual control. What psychoanalysis can contribute to this picture is the role of internalized parent images in ego development. Patterns of parental response to the infant's expression of drives provide models for the infant's developing capacity to regulate her own drives. Since the attachment drive is the primary link between infant and parent, it is at the core of ego development (Fonagy, 2001; Fonagy et al., 2014). From a Freudian perspective, attachment and later the sexual drive are special cases of the eros principle (Pederson, 2015). How an adult loves is shaped by how he or she was loved as a child (Fonagy et al., 2014; Fraley, 2018).

When parents love their child competently and receive his or her love in return, the child can fully develop, individuate, and flourish. In such cases, unconscious identifications and projections can be progressively brought to consciousness in the course of normal adult development (frequently after being encountered as dream figures). These elements of the self continue to be parts of the personality, but in the individuated person they come into conscious relationship with the ego, complementing and aiding the latter in the service of more autonomous functioning. By contrast, inadequate parenting in its many forms—neglect, abuse, micromanagement and more subtle failures—leave a legacy of relational trauma that brings people into psychotherapy.

This picture is confirmed by research showing the importance of satisfying social relationships for mental and physical health and the pathogenic effects of relationship deficits as measured by loneliness (Heinrich & Gullone, 2006). There is also some evidence about brain and behavioral variables that may mediate various forms of relational trauma. Mumtaz, Khan, Zubair, and Dehpour (2018) explored the effects of social isolation stress on neurotransmitter systems in mice and rats. Berry et al.'s (2012) experimental research with mice shows that social isolation measurably impairs brain physiology by reducing BDNF (brain-derived neurotrophic factor). A longitudinal study of 92 children showed that maternal support observed in early childhood was strongly predictive of hippocampal volume measured at school age (Luby et al., 2012). The positive effect of maternal support on hippocampal volumes was found to be greater in nondepressed children.

Finally, untreated relational trauma leaves adults at risk of reproducing with their children the dysfunctional parenting models that they experienced in their own childhoods. A 30-year retrospective study of 38,556 South Australian mother-child dyads found that children are at high risk of maltreatment if their mothers experienced maltreatment as a child (Armfield et al., 2021). Experimental research suggests that one mechanism of intergenerational transmission may involve excessive reactivity to stress, which is found to impair maternal care in rats and transmit stress reactivity to offspring (Caldji, Diorio, & Meaney, 2000).

For humans, psychotherapy is found to reduce unconscious displacements (Milburn & Conrad, 2016; O'Keefe, 2018), presumably including displacements onto children, a central mechanism of intergenerational transmission of parenting patterns. The origins of this transmission are evident from watching young children playing with dolls, a practice in which they simultaneously re-enact what was done to them and rehearse what they will do with their own children. Such doll play is also a perfect window into mastery through reversal of voice in action and the dynamics of reorganization.

To prevent the repetition of relational trauma and proactively improve the mental health of future generations, there is perhaps no more powerful, societal-level intervention than parenting education. The Wonder Weeks book (Plooij et al., 2019) and website (https://www.thewonderweeks.com/) are precisely such an intervention, and are a pioneering application of PCT to early childhood

development. Home visiting programs for post-partum doulas and pediatric nurses is another kind of parenting education, which supports healthy attachment and parents' capacity for mentalization/reflective function (Goodman, Dodge, Bai, Murphy, & O'Donnell, 2021).

Parenting curricula can also be introduced into primary education, when children play at parenting with dolls, and can be continued through secondary school and college, when many adolescents and young adults will be preparing to actually enter parenthood (Kind, 2014; Miedzian, 2019). Teaching such classes to boys as well as girls also helps dismantle the intergenerational transmission of gender stereotypes, notably the notion that baby care is woman's work (Miedzian, 2019). Other parenting education initiatives include the French magazine PEPS (see https://pepsmagazine.com/ and Cotton, 2021), which provides a forum for parents to share positive parenting practices and experiences, and Parents First!™, an educational organization that supports parenthood (see https://parentsfirst.net/).

Social interventions of this sort are urgently needed to support the mental health of communities; even more effective interventions may be developed in the future based on research informed by PCT and psychoanalysis. In particular, a more adequate theory of personality development can be built by integrating the PCT concepts of reorganization (Powers, 1973/2005, pp. 179–204) and stages of early childhood perceptual control (Plooij, 2020) with concepts drawn from psychoanalysis, especially displacement, identification, and mastery through reversal of voice.

Frontiers of the self: "Pure consciousness" and higher states of consciousness

As indicated previously, I have been using "the self" in this chapter primarily to mean the control of self-image, which corresponds roughly with what Freud called "the ego" and which I situate at the apex of the human control hierarchy, what William T. Powers called the "system" level. It is here that someone constructs an image of the kind of person they are (their self-image) and want to be (ego ideals) or must be (impulse control models), two different kinds of reference perceptions.

A second and broader concept of the self is that innate mental faculty that experiences one's entire "stream of consciousness"—a person's continual flow of thoughts including words, images, feelings, and sensations. Here we are in the realm of the reorganization system, which can access not only the self-image control systems, but every other level of the perceptual hierarchy. The self at this stratum is that which attends to present perceptions, recalls memories of past experience, imagines future scenarios, and adjudicates conflicts between control systems—common experiences in Method of Levels sessions (Mansell & Goldstein, 2020). For more on this stratum of subjectivity, refer to Warren Mansell's chapter on consciousness in the current volume (Chapter 2).

Finally, we reach the third and broadest stratum of subjectivity, a universal aspect of consciousness that includes but transcends the individual personality and body. C. G. Jung, who called this the archetype of the Self, identified recurring symbols in the world's mythologies and the dreams of individuals that represent the self in this universal sense, frequently symbols pertaining to mystical or religious experience (D'Agostino & Leicher, 2023; Jung, 1964/1976). My understanding of this topic is indebted to scholarly literature on mysticism (Andresen & Forman, 2001; Forman, 1999) and neuroscience research on "higher states of consciousness" (Cvetkovic & Cosic, 2011; Mosini et al., 2019; Travis, 2021; Travis & Pearson, 2000; Travis et al., 2002, 2009). After reviewing key findings from these sources, I will relate them to William Powers' ideas about a possible new level of perception above what he called the "system" level (Powers, 1973/2005, pp. 174–175).

The topic of mystical experience encompasses a range of diverse phenomena at the intersection of psychology, religion, philosophy, neuroscience, and meditation practices (Andresen & Forman, 2001; Forman, 1999). My starting point for this discussion will be the "pure consciousness event," a kind of experience that has been reported in various forms in many historical periods and cultures (Andresen & Forman, 2001; Forman, 1999) and which is the subject of numerous peer-reviewed neuroscience studies (Cvetkovic & Cosic, 2011; Travis, 2021; Travis & Pearson, 2000). This kind of experience can occur spontaneously, and also in conjunction with certain meditation practices.

The pure consciousness event is the unique experience of being awake and alert but having no thoughts or objects of awareness. An analogy is watching a film projected onto a white movie screen and then having the film end and seeing the light from the projector illuminating just the screen itself. This experience conveys a universal aspect of the self that transcends the individual personality and body.

There is a natural and effortless meditation technique associated with the Advaita Vedanta tradition that brings about the pure consciousness experience in a reliable manner (Travis, 2021; Travis et al., 2002; Travis & Pearson, 2000). As taught in the form of Transcendental Meditation, this technique has been investigated in over 380 peer-reviewed publications that encompass its effects on neurophysiology and its efficacy in the treatment of anxiety disorders, depression, addictive diseases, aging, cardiovascular conditions, diabetes, convict recidivism, and more (Mosini et al., 2019; O'Connell & Bevvino, 2015).

One strand of research is especially relevant to the topic of mystical experience, namely the long-term effects of meditation on the brain and "higher states of consciousness," the experiential correlates of enhanced brain functioning. While a novice meditator typically experiences pure consciousness events only during the restful alertness of meditation itself, the alternation of meditation and normal activity over a timescale of months and years produces long-lasting changes in the structure and functioning of the brain. These include measurable increases in broad-band frontal EEG coherence, frontal and central

alpha relative power, and increased match between brain preparatory responses and task demands (Travis, 2021; Travis et al., 2002). These indices have been combined into a "brain integration scale," which measures the growth in higher states of consciousness, also called "enlightenment" (Travis, 2015, 2021; Travis et al., 2002).

The most salient experiential feature of enlightenment is the expansion of a person's sense of self from one's individual personality and body to include pure consciousness, which becomes a permanent feature of experience alongside normal activity and sleep. The pure consciousness event is direct experience of the unbounded and unchanging substratum of the mind, referred to variously by mystics as the Absolute, Brahman, the Void, the Ground of Being, and the like. With the self increasingly anchored in this stabilizing experience, the ego can "let go" and the individual becomes highly flexible, adaptable, and creative, as documented by research on long-term TM meditators (Mosini et al., 2019; O'Connell & Bevvino, 2015; Travis, 2015).

Finally, how should we understand all this from a PCT perspective? Since higher states of consciousness entail a non-dualistic mode of functioning of the entire brain, this phenomenon both encompasses and transcends the perceptual control hierarchy and reorganization system inasmuch as they are systems based in the brain. If one's brain is functioning dualistically, "the self" and "the world" are experienced at the apex of the hierarchy as separate aspects of reality. Novice meditators also function dualistically inasmuch as they experience pure consciousness as separate from ordinary waking activity. With the regular practice of meditation, however, all duality in experience is eventually transcended, and the person experiences him or herself as identical with the whole of nature or existence (Forman, 1999).

This is certainly a mode of perception beyond the system level, but not perception that is controlled like other perceptions or that provides specific reference perceptions to the system level. Rather, it is a permanent style of functioning of the mind and brain, and therefore cannot be disturbed by lower-level perceptions. Nor is this style of functioning learned through a control process involving effort, but rather by an effortless mental technique that facilitates the spontaneous occurrence of pure consciousness events during meditation sessions.[n]

This analysis is consistent with Powers' speculation that the system level may be incomplete and capable of being superseded by further learning. It is just that the further learning is not and cannot be another level of control. Indeed, that would create an infinite regression because we would always have to ask where the highest-level reference perceptions come from. The control

n. Note the inherent contradiction of using control to facilitate the pure consciousness event; if the latter is considered a reference perception and the experience of thoughts during meditation is considered an error state, the meditator will get stuck thinking she must clear her mind, which is itself a thought and thus negates the pure consciousness event. Transcendental Meditation, which is a completely effortless technique not involving control, bypasses this paradox (Forman, 1999).

hierarchy has to terminate somewhere, and it does at the system level, whose reference perceptions come from our genetic code and from memory, as Powers said (Powers, 1973/2005, pp. 174–175). The system level is only incomplete in the sense that it harbors a dichotomy between subject and object; the further learning needed for wholeness is not another level of control, but the evolution of a non-dualistic style of functioning of the mind/brain that can be cultivated by the practice of meditation.

The identity of oneself and the universe may seem at first glance inconsistent with scientific materialism. In light of current astrophysics and ecological science, however, this experience may convey a more adequate understanding of reality than the common perception of the self as an isolated ego and body. It is known, for example, that the human body's chemical elements come from and return to the stars. On a shorter timescale, the individual body emerges from and returns to earth's biosphere, just as every person is a product of and contributes to their community. At a more abstract level, field theories tell us that physical objects are only localized in a superficial sense and are fundamentally fluctuations of fields that extend infinitely in spacetime (Carroll, 2016).

In the final analysis, however, the holistic view of reality that science requires today will continue to seem counter-intuitive for anyone whose perceptual machinery operates dualistically. It is only from the vantage point of higher states of consciousness that non-dualistic understandings become not only scientific concepts but palpable perceptions. In summary, the reported experience of mystics and advanced practitioners of meditation, neurophysiology research, and general science all tell us that higher states of consciousness are a valid form of perception, arguably more valid in fact than dualistic experience.[o]

This concludes the current chapter on sources and dynamics of the self. We have tackled an ambitious agenda of topics: the areas of intersection and complementarity between PCT and psychoanalysis; the use of Q-sorting to model control of self-image, informed by psychoanalysis, the sociology of gender, and political psychology; a general theory of personality development based on "mastery through reversal of voice"; and mystical experience and higher states of consciousness as a frontier of self-perception beyond the perceptual control hierarchy and reorganization system. This was hopefully more than a set of disparate inquiries, and provides a comprehensive conceptual framework for

o. To be clear, the claim here is not that mystics and meditators have access to an esoteric reality beyond science. Rather, the common experience of events separated in time and objects localized in space is superficially valid at best, according to relativity and quantum mechanics (Carroll, 2016) and general systems theory (von Bertalanffy, 1968/2015). It should also be noted that European philosophy reached similar conclusions more than a century before science. Kant's 1781 *Critique of Pure Reason* showed that time and space in common experience are not aspects of the world but of our minds. Hegel's 1816 *Encyclopedia of the Philosophical Sciences* went further (Stace, 1924/1955) and proposed the kind of holistic picture of reality that was later discovered in a different form by 20th century science. Peer-reviewed neuroscience research further tells us that the human brain is capable of perceiving reality holistically (non-dualistically), and that such capacity can be cultivated by the practice of meditation (Travis et al., 2002; Travis & Pearson, 2000)

thinking about the self from a PCT perspective. If this framework proves to be helpful and productive to some significant degree, this chapter will have accomplished its purpose.

Technical Appendix: Q-sorts and synchronic modeling of the self

A Q-sort (Brown, 2008) is a synchronic (snapshot) form of data that complements the diachronic (time series) data found in classical PCT research; it is a powerful tool for empirical research on the control of self-image. To illustrate a diachronic PCT study, consider the previously mentioned experiment in which a subject is asked to track a moving object on a computer screen. The instructions might initially be to keep the cursor 1 inch above the moving object. The researcher can then measure successive positions of both the target object and the cursor at regular time intervals, providing temporal data on disturbances and how the subject counteracts them. These data at many time intervals can then be used to test a formal model of how the subject controls his or her perception of the variable.

While this research design is suitable for mathematically modeling the dynamics of sensory-motor processes, to model system level control using diachronic methods is more elusive. The latter can be done informally, however, in an interview setting. For example, if the researcher wants to know whether the subject is controlling a perception of himself as "cooperative," she could say, "Why are you being uncooperative?" If the subject is in fact controlling this aspect of his self-image, the researcher's comment will be a disturbance to his control, and he will typically try to counteract it, perhaps by insisting that he *is* being cooperative. If he is not controlling a "cooperative" self-perception, however, he might simply be puzzled by the researcher's comment and otherwise exhibit indifference (Robertson, Goldstein, Mermel, & Musgrave, 1999).

This kind of interview technique, which is an informal way of "testing for the controlled variable" (Marken & Mansell, 2013) at the system level, explores the control of self-image diachronically. However, it is not a substitute for systematic data collection, which can be done using a synchronic method. Consider, for example, the Q-sort task shown in Fig. 1. The subject is asked to represent his or her own personality by ranking 72 adjectives into a bell-shaped grid. Fig. 1 shows the adjective list and a possible Q-sort (ranking). Adjectives placed in the leftmost positions of the grid indicate traits that the subject considers "least characteristic" of them, in the rightmost positions, "most characteristic," and so on along the whole continuum.

It is worth analyzing in PCT terms what occurs when someone models their own self using such a Q-sort. First, according to PCT, the self is not a static collection of traits but an active process of control. What, exactly, is someone controlling at this "system" level? For one thing, they are controlling aspects of their self-image, dynamics that we would expect to become manifest when someone completes a Q-sort. If a person is controlling an image of himself

as "not feminine," for example, we can generally infer that he would place the item "feminine" in the "least characteristic" tail of his Q-sort, which in fact is the case in Fig. 1. If he is not controlling this aspect of self-image, he may still place it in the negative half of the ranking, but other things being equal closer to the neutral center.

While individual traits may be regarded as possible perceptual inputs from the principle level, it is the self at the system level that sorts the traits; the resulting Q-sort therefore represents the personality as a whole, captured at a single moment in time, that is, synchronically. The use of an approximately normal distribution facilitates correlation of the resulting Q-sorts, about which more is said below. However, the individual Q-sort remains the fundamental unit of data, consisting of multiple elements in well-defined relation to one another as in a matrix.

The use of Q-sorting raises methodological issues that are beyond the scope of this chapter. For our purposes here, I will address just two topics involving the data per se and some issues involving statistical analysis of the data. First, in the case of a self-assessment Q-sort, we can expect some distortion due to what is called "social desirability bias," a characteristic of all self-reported data. This pertains to the tendency of survey respondents to under-report socially undesirable traits and over-report those that are socially desirable, insofar as respondents want to "look good" in the eyes of the investigator.

Like any other kind of statistical bias, social desirability involves a systematic skewing of the data. In a society that stereotypes people according to their sex, for example, males would be expected to under-report the extent to which they perceive themselves as "feminine," in order to avoid the stigma of not appearing to be "a real man." This effect may matter or it may not, depending on the research question. For the psychology of militarism research reviewed in this chapter, such bias does not matter because regardless of whether the data are skewed, placement of the item "feminine" in the Q-sort differentiates male hawks and doves, which is the question of interest.

That said, it is not obvious how to interpret patterns in data, a problem faced by all quantitative researchers. Are males who place the item "feminine" in the negative tail of their Q-sorts controlling their private self-image, or are they controlling how they want the investigator to perceive them, or both? Such questions cannot be answered with reference to the data alone. We need to place the data into a relevant theoretical framework, in this case the psychodynamics of mother-raised males who are socialized to renounce their "inner feminine," as discussed previously. Understood in that framework, the data are consistent with white male hawks controlling a private self-image of being "not feminine." Social desirability bias may overdetermine their placement of "feminine" in the negative tail of the Q-sort, but that it not relevant to the research question.

A second problem involving the data is that items placed in the tails of a Q-sort might not in all cases indicate a controlled variable. For example, a person who places "absent-minded" in the positive tail of his or her Q-sort is telling us something about their self-perception, but this trait may be an epiphenomenon of their psychodynamics and not itself a controlled variable. As in the case

of social desirability bias, a valid interpretation of patterns found in Q-sort data requires that the data be related to a relevant theoretical framework. Without a statistical pattern and a theory of absent-mindedness that can help explain it, the isolated datum of where one individual places "absent-minded" in their Q-sort tells us little.

Finally, we turn to the use of statistical methods to correlate multiple Q-sorts. While such methods are commonly used to model causal processes (Hayes, 2018), the correlation of Q-sorts obviously has nothing to do with causal relationships among variables; one person's ranking of the traits clearly has no causal relevance to another's. Statistical methods are used in Q-methodology to generate models of structure, not of causal process (Brown, 2008). The standard procedure is to correlate the Q-sorts and then use factor analysis to generate what Max Weber called "ideal types." If the Q-sort items consist of personality adjectives, the ideal types will be a personality typology.

As with any personality typology, such as one obtained using factor analysis, some specimens approximate the ideal type more closely than others. In Q-methodology, many researchers use theoretical factor rotation (Brown, 2008) to align their typologies as much as possible with actual specimens. While the psychology of militarism research discussed above did not employ correlation or factor analysis as generally practiced in Q-methodology, a similar alignment was assured for the composite Q-sort, because a given personality trait could only end up in the tails if a number of actual specimens assigned the trait to the tails in their individual Q-sorts.

This brings us to some limitations of statistical methods as applied to Q-sort data. Suffice it to say here that any personality typology generated using factor analysis can be sensitive to the particular items included in the Q-sort or other instrument, the particular sample of persons selected (at least in the case of small samples, which are common in Q-methodology studies), the particular method of factor analysis used (e.g., centroid or principal components), and the particular method of rotation used (e.g., "theoretical" or varimax).

Many mainstream social scientists reject a methodology pervaded by such indeterminacy (Kampen & Tamás, 2014; Tamás & Kampen, 2015), but Q-methodology researchers see indeterminacy as inherent in the nature of subjectivity (Brown, Danielson, & van Exel, 2015; Ramlo, 2016). Such philosophical debates go back to the origins of Q-methodology (Burt & Stephenson, 1939) and are not likely to be resolved any time soon. For purposes of the psychology of militarism research discussed above, I did not need to involve myself with such debates because I did not use correlation or factor analysis in the manner of Q-methodology.[p]

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p. Rather, I used bivariate correlations between individual traits and militarism scores to explore patterns in the whole data set, an "R-methodology" (Burt & Stephenson, 1939) use of statistics. My only use of factor analysis was to check whether the policy questionnaire in fact contained a single, bipolar, hawk-dove factor, that is, to check whether it was measuring what I intended to measure. It did, as I expected.

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I first encountered perceptual control theory (PCT) through psychologist David Goldstein. In the 1980s, he and I were both using Q-sorting (a kind of data collection technique) for psychological self-assessment. At the time, I was doing research on the psychology of militarism at Columbia University, for which I earned a doctorate in political science. I attended two or three annual meetings of the Control Systems Group (as the PCT community then called itself), and had the opportunity to meet and interact with Bill Powers.

Focused on understanding militarism and the war system, my research was exploratory and eclectic regarding psychological theory and methodology. I conducted a survey of US foreign policy elites (the Council on Foreign Relations) using an original hawk-dove political questionnaire and a personality self-assessment Q-sort. To make sense of the data I collected, I read psychoanalytically informed studies of gender socialization and of the role of childhood corporal punishment in shaping adult political attitudes. I eventually developed an empirically based psychology of militarism that combines PCT with these strands of psychoanalytic research.

Meanwhile, I found myself unable to make a secure livelihood in higher education and ended up teaching mathematics in New York City public high schools. While working as a math teacher, I also coached student robotics, which seems to me an important arena for bringing PCT to the general public. My partner Constance L. Benson is a teacher, historian, and religion scholar. During retirement, I am spending my time doing independent study, writing, volunteering with the International Psychohistorical Association, and enjoying the flora and fauna of Riverside Park, near Connie's and my apartment in Manhattan. You can visit my website at https://bdagostino.com/.