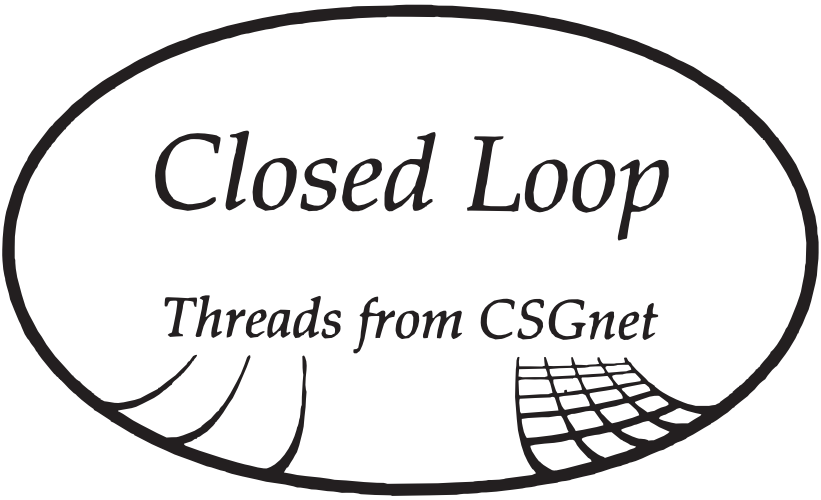

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Posted at www.pctresources.com

Proofread as of March 8, 2001

Fall 1992

Volume 2

Number 4

Front cover

Closed Loop

Threads from CSGNet

Fall 1992 Volume 2 Number 4

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Members of the Control Systems Group receive *Closed Loop* quarterly. For membership information, contact Ed Ford, 10209 N. 56th St., Scottsdale dale, AZ 85253; phone (602) 991-4860.

CSGnet, the electronic mail network for individuals interested in control theory as applied to living systems, is a lively forum for sharing ideas, asking questions, and learning more about the theory, its implications, and its problems. The "threads" in each issue of *Closed Loop*, stitched together from some of the net's many ongoing conversations, exemplify the rich interchanges among netters.

There are no sign-up or connect-time charges for participation on CSGnet. The Bitnet address is "CSG-L@UIUCVMD" (use no quotes in this and the following addresses); "CSG-L@VMD.CSO.UIUC.EDU" is the Internet address. Messages sent to CSGnet via these addresses are forwarded automatically to all participants. Via CompuServe, use the address ">INTERNET:CSG-L@VMD.CSO.UIUC.VMD" to reach the net. Initially, you should send a note to the network manager, Gary Cziko, at the Internet address "G-CZIKO@UIUC.EDU" (Gary's voice phone number is (217) 333-4382).

Inside front cover

Conflict, Belief, Standards: Part I

Ed Ford: I have been meeting with a group of my former students every month for the past year or so, and recently we decided to attempt to apply perceptual control theory (PCT) to their work, specifically to the way they organize their staffs, run their organizations, deal with people, etc. Anything they do, from running a staff meeting to a group meeting, from setting standards to dealing with individuals, is to be done with PCT in mind. As a first step, they have to think of others as living control systems. Each time we meet, everyone will say what they have tried at their various places of employment. We'll review what they have done, whether it has been effective, and whether their knowledge and application of PCT have helped. The more people on the net talked about modeling, the more I realized that I had to get some modeling going of my own.

The jobs held by this group are most interesting. One is a superintendent of schools for Arizona's juvenile residential correctional system. Another heads a residential treatment center for sexually abused 7- to 11-year-old girls. Another is in charge of counseling and training at a residential treatment center for teenaged boys. Another works with the toughest behavior problems in a school district. Another is an adult probation officer. Another works with the most violent people in a state mental hospital. Another runs groups for women with various types of problems.

These are the kinds of settings where the rubber hits the pavement. These people don't play games; they're serious about succeeding and doing a better job. Both the supervisors and staff in these kinds of settings generally are all looking for a better way to make their job easier, more efficient, and more satisfying.

One example we're trying is developing a way to get your staff to do a good job. I think you first have to get each member to explain what he/she has done successfully, what they are presently working on, where they need help, and from whom. Problems are brought up, and a person from the staff volunteers to take the responsibility for researching and bringing back the results to the group for a group decision, yet my experience is that there is an ongoing recognition of where the final decision rests. In this kind of system, people begin to perceive that they have some control for setting reference signals and providing input to the system. They become much more cooperative and much more willing to look for a better way. The staff members are

each operating as individual control systems, but each finds they can, through a cooperative structure, provide inputs to what is happening, know what other systems are perceiving and controlling for, and be able to control more easily for what they want and for their specific tasks. When the commitment to some overall concept of the organization is missing, the inevitable result is internal conflict.

Each person in our group is attempting to teach his/her staff PCT. The real key is our working together at our monthly meetings to reflect on what each is doing (using PCT as a basis), giving our own inputs, and then watching the results. I guess this could be called modeling in the real world. I have a close friend who is a Catholic priest and was recently assigned his own parish. He already has invited me to give these ideas a try at his parish.

Bill Powers: Ed Ford mentioned his monthly meetings with people interested in using control theory in the real world. In a phone call, he asked me to say something that would help his group "make models." I replied that what his group can do is probably better called "testing models," so that is what I'm writing about here. I'll digress at the start to introduce some background on the concept of prediction. The first part of this development is intended to amuse experimenters; the second part gets to practical matters.

On Testing Models

Part 1

Some time ago I remarked that the most common model in psychology is a cause-effect model in the form of a regression equation. The hypothesis is that the effect depends on the cause linearly, as in $y = ax + b$. To test this model, you'd take the values of a and b determined from a formal study and try to predict new values of y from new observations of values of x.

David Goldstein commented that this concept of using a model for predictions is not the way such findings are used in psychology. Once the regression line is drawn through the data points, that's the end of it. The model equation describes the data, but isn't then used for predictions.

On thinking this over, I agree that no formal use is generally made of the regression equation, but the findings are certainly used to predict individual behavior. Suppose the dependent variable y is a clinical measure of depression, and the independent variable x is a depression-factor score on a personality test. In computing the correlation between the test score and the clinical measure (in a study of many people), a

regression equation of the form y = ax + b is the basic premise behind the correlation calculation. If the correlation is positive and statistically significant, the conclusion drawn is that depression is predicted by the test score. Then the test is administered to a new individual (presumably from the same population), and if the depression-factor score is high, the person is diagnosed as depressed.

This isn't a formal application of the regression equation: you don't say that a test score of exactly 7 predicts a depression of exactly 25 units on the clinical scale, even if that's what the regression equation says. But a person who measures 15 on the test score would be judged as more depressed than a person who measures only 3. So while the slope and intercept coefficients aren't explicitly used, the general trend is implicitly used, and there are semi-quantitative judgements made.

The scatter in data of this kind is so great, of course, that literal application of the regression equation would be silly. The prediction for any individual when the correlation is as low as 0.8 would be seriously wrong most of the time, often even getting the sign of the relationship wrong for one person. The only correct way to make a prediction would be to begin with another equally large sample of the population and do the whole study again. You would predict that the same regression coefficients would be found.

But there is an urge to predict for individuals, and the form of the urge follows the regression line: a higher clinical score ought to predict a more severe depression. While it is folly to give in to this urge when the data are so bad, the motive behind doing so is consistent with the principle of modeling.

If the principle of modeling were followed through formally, the regression line would indeed be used to predict behavior. If the line has the equation y = 3x + 5, and the depression-factor test score for a new individual is 4, the model predicts that a clinical evaluation of depression will come up with 17 on the clinical scale for that person. To follow the test through, one would then submit the person to the same clinical evaluation as used in setting up the model, and see what number actually results.

Suppose the actual depression measure is 12 on the clinical scale. This is a deviation of -5 units from the value of 17 predicted from the test score, for an error of -29 percent. Is that good, or is that bad? The answer depends on how important it is to get the evaluation exactly right.

Of course in this case we know the clinical measure of depression, and if we believe it, we can just ignore the test score and the prediction. But what if we want to make the diagnosis on the basis of the test score alone? Now the generally expected error for an individual prediction becomes relevant. If you're going to prescribe electroshock therapy that will most likely severely disturb the person's life for many years,

maybe even permanently, you might decide that a 29 percent error is too large to allow. Perhaps even an error of 5 percent would be too large if the person is a borderline case. On the other hand, if you're going to prescribe a tranquilizer that won't do any permanent harm even if the person isn't really depressed, then perhaps you can allow errors as large as 29 percent.

I've gone through this to illustrate that prediction errors can't be judged as good or bad without taking the context into account. But what if the context is that of testing a general model of behavior? Now the actions taken as the result of a diagnosis are no longer in the picture. All we want to know is which theory is better. Now the errors of prediction under different models are judged not against practical standards, but against each other. The smaller the expected error, the better.

I've also tried to show that even in standard approaches, the method of modeling is there just beneath the surface. It's probably not mentioned much because the predictions made from literal application of the mode—the regression equation—are so poor. But the model is there. It's that model that we have to compare against the control theory model, and the way we do the comparison is through making quantitative predictions using the actual form of the model.

Let's look at the rubber-band experiment. Suppose we just measure the position of the experimenter's end of the rubber bands and of the subject's end, designating the positions as a and s. Let's confine the experiment to a line, so we consider only one dimension. The zero point on the line can be chosen arbitrarily, with all measurements made relative to that zero.

If we now measure the positions a and s over a long series of movements by the experimenter, we will obtain a data set consisting of pairs of values of a and s. We can do a correlation between a and s. From the normal calculations, we can derive a regression line.

The regression line will have the form $s = ae + b$. The position of the subject's end will depend on the position of the experimenter's end. If the rubber-bands are identical, the coefficient a will be very close to -1. Half of the intercept b will correspond to a position on the line. That position will be the average position of the ends of the rubber bands: with $a = -1$, we will have $(s + e) = b$, or $(s+e)/2 = b/2$.

In fact, half of the intercept b will turn out to be a position nearly underneath the knot where the rubber bands are connected. The knot, as it will turn out, remains very nearly at the position $b/2$ all during the experiment.

There's a moral to this story, but it's not quite obvious yet. The first part of it is that when you do a stimulus-response experiment in the usual way, to get a regression coefficient, you can *sometimes* translate it

directly into a control-system experiment. If you find that the intercept b corresponds to something in the experimental situation that's remaining nearly constant at that value, you've found a controlled variable—actually, by finding its reference level first.

The second part of the story concerns the accuracy of the prediction. The stimulus-response prediction will be accurate only if the two rubber bands have identical characteristics, or strictly proportional characteristics. If their characteristics are different, the correlation coefficient you derive from the data corrected for the different rubber-band properties will be very much higher than the one derived from the model s = ae + b, which assumes identical rubber bands.

Part 2

In testing the control-system model, the basic procedure is to assume that all behavior—without exception—is control behavior, predict behavior on that basis, compare the prediction with the appropriate data, and let the match or mismatch decide the issue. You can never prove that a particular control-system model is the only correct one, but you can show that it is incorrect.

Considering the low correlations that are found in stimulus-response experiments, it might seem hopeless to substitute a PCT model for the linear regression model. When the data are that noisy, how can any clear decision be made? This objection, however, assumes that the stimulus-response experiment has correctly represented the data. While we can't prove that *all* stimulus-response experiments could be translated into relatively noise-free PCT experiments, there are excellent reasons to think that this can be done in a significant number of instances, maybe even most instances. To do this, however, requires some changes in viewpoint that might be hard to achieve.

A stimulus-response "fact" is expressed as an effect of a cause. Doing something to a person results in that person's doing something else. If the relationship expressed in this "fact" isn't clearcut and quantitative, then the control theorist has to start asking questions about the data.

The basic question is: what is it that was affected by the "stimulus" that was also affected by the "response"? If you utter encouraging words to someone, and that someone then shows added efforts to achieve something, you have a stimulus-response relationship. Now you have to try to guess: what did the encouraging words affect that was affected *equally and oppositely* by the increased efforts?

Equally *and oppositely?* There's the rub. You would like to think that there is something you said that helped this person do better. But control theory says that if your words of encouragement had some regular effect on the person's behavior (apparently), that behavior was aimed

at *counteracting* your influence. If this is true, then you don't have the control over the person's behavior that you thought you had, even for the good. You are seeing yourself as helping the other person to do better. The other person, however, is seeing the situation differently: you're disturbing something, and the other person is acting to cancel the effect of the disturbance.

This might not be true, but if you're going to test the PCT model honestly, you have to pretend it's true and try to make sense of it. You can't test a model if you don't follow its logic faithfully and literally as far as you can. You can't look ahead and think, "If PCT is right, then I haven't been helping people the way I thought I was—so PCT must be wrong." You have to be prepared to change your ideas about anything at all. Otherwise your reasoning is just a sham.

Let me give you a real example from my high-school days. We had a coach, named Coach, who was tremendously popular, a great guy. We all loved him and wanted his approval above anything else. Coach would say, "You can do better than that, I know it—just give it one more try and you'll make it." And by golly, we'd give it one more try, and we'd make it, sometimes.

Now it would seem that his encouragement and belief in us caused us to try a little harder than we thought we could, so we achieved something we couldn't do before (sometimes). I suppose that Coach looked at it that way, as any reasonable person would. But I can tell you that from inside at least one person (and at the time I guessed this was true of a lot of the others), it wasn't all that nice.

The basic problem was that Coach went around all the time saying to people, "What you're doing isn't good enough to please me." That's what "you can do better" says. I was already doing better than I thought I could, in number of pushups, speed of climbing a rope, time in the 40-yard dash, or whatever. And I was damned tired and hurting and not necessarily interested in doing any better. I liked physics a lot better than physical education. But there was Coach telling me that he didn't like what I was doing. That mattered to me. So I got myself together and made it really hurt, and I felt great—because then Coach wasn't displeased with me, not because I'd achieved something I wanted, but because I'd done something to counteract his disapproval.

From Coach's point of view, he had helped me put out that extra bit of effort to surpass my previous achievements. No doubt if I had continued to go along with this, worked out, built up a lot of strength, learned the football playbook by heart, and all of that, satisfying the coach more and more all the time, I might have achieved even more. I might have been a college football star; I might even have become a professional football player and ended up as a coach myself, by now. I might be bold, aggressive, commanding, and rich. But I certainly wouldn't be writing

this. I also wouldn't be the Bill Powers you know.

What actually happened was that many of us simply gave up on pleasing Coach because we didn't buy the goal. It wasn't pleasant to do that—to decide we were trying as hard as we cared to try toward that particular end, and that we would simply endure the disapproval. We still loved Coach, and we tried to fend off his disapproval by seeming to try harder. But the price was too high to really do it. When Coach was called into the Navy and left in 1944, there was a huge tearful farewell ceremony for him, and I'm sure that amid the sorrowful participants there were many hearts filled with relief.

To apply the PCT model, this is the sort of thing you have to think about. It's especially difficult when the hoped-for effect on a person is beneficial. There's an almost inescapable tendency to suppose that what you think of as beneficial is also considered beneficial by the other person; that what you consider harmful is also thought harmful by the other. Coach would have been completely baffled by the present discussion. He would have said "Well, you did try harder, didn't you? And you did do something you thought you couldn't do, didn't you? What's so bad about that?"

The stimulus-response viewpoint encourages this sort of naive projection of one's own goals onto the behavior of others. I shouldn't even call it the "stimulus-response" viewpoint. It's really this viewpoint, adopted innocently by well-meaning people who have never heard of stimuli and responses, that led naturally into stimulus-response theory.

To test the PCT model in real life, you have to be prepared to follow its logic all the way. Forget about whether the "response" is good or bad. The question is how to find the controlled variable, the thing that is disturbed by what is done to the person, and is protected against more disturbance by the action that the person takes. If you find such a controlled variable, you will understand that person far better than you did before. If you want to help that person, you might even find out what he or she really wants and figure out ways that person could get there.

It's possible that you won't find any such controlled variable in a given circumstance. But if you don't look for one, you will certainly not find one, even if it's there staring you in the face.

The basic message here is that to test PCT, you have to make predictions from it and from nothing else. You have to follow out the logic even when it seems to say things you don't believe. Then you have to look carefully to see whether, in fact, the prediction holds true. This requires being consciously open-minded and willing to take a chance. You simply have to trust that if the theory does predict correctly, you'll be better off knowing what it predicts than not knowing, letting the chips fall where they may.

Martin Taylor: In his interesting example of the kindly coach who induced him to try so hard that it hurt, but produced great performances, and induced him to hate the coach because of it, Bill argues that all attempts to control are just introducing disturbances that are resisted in maintaining reference percepts, and that inevitably such resistance is accompanied by resentment or other bad effects (I might exaggerate, but that's what I get out of the example).

I quite agree with the first half of the conclusion, but not with the second. There is no technical distinction between the alteration of the error signal in an elementary control system by changing the reference versus by changing the percept. Each results in a determinate error signal that results in behavior that reduces the error (assuming a well organized control-system hierarchy). The coach played on this by assuming that Bill had a reference to be liked and admired by the coach, and by causing Bill to perceive that this was not the situation, though it could be. The coach also presumably assumed Bill had another reference (shared by athletic overachievers) that he should do as well as his *body would* permit. Bill asserts that he did not share that reference. If he had, then the coach's behavior would have induced percepts that caused errors with respect to each reference that the same behavior would have satisfied. But since Bill did not have the "excellence in athletics" reference, the "hurting" behavior helped to satisfy only the "find favor with the coach" reference, and it conflicted with the reference most people hold: "feel good in my body."

I don't think it is necessarily true that this sort of conflict leads to resentment and bad feelings. The better a system is controlling, the lower the errors within it, almost by definition. Rick Marken has pointed out that the errors don't go to zero if there is non-orthogonality within a control hierarchy, so that, to some extent, behavior that helps reduce one error increases another. Such conflicts are almost inevitable in a complex hierarchy, especially one in which there are fewer final degrees of freedom for control than elementary control systems at any one level. The human muscular system provides a good example: some 400-800 muscles (I don't know the exact number, but that's the range) control around 125 degrees of freedom for joints, face, voice, and so forth. There are two ways of resolving the conflict: mutual control, such as in opponent muscle pairs (one zeros its control while the other works), or tension (each tries to achieve its reference, and a balance between then is achieved).

I think tension and conflict are desirable, if not overdone, enabling a control system to react promptly to changes in perceptual situations. This is analogous to the temperature of a thermodynamic system. Zero conflict means a system perfectly organized for the disturbances the environment presently provides—the system is frozen and will not

necessarily be able to respond well to new types of disturbance. Some tension means two things: the system is ready to move fast in many directions, and, equally important, it is prepared to reorganize if Bill's notion about reorganization being driven by accumulated error is correct. So a system with tension and conflict will be more robust than one that is placidly content.

The end-point of this line of thought is that we should have evolved to be happier with some level of disturbance and internal conflict different from zero than with a bland, disturbance-free environment or an environment that we have totally under control. Bill's coach was right, but perhaps went too far. Mild social control of that kind is what we like. We want to do well for other people, but we do want to find that we can reach the reference level of satisfying them without at the same time working too hard (diverging from other reference levels). I suspect that many marriage problems arise from a perception of inability to satisfy the partner, despite excessive efforts (which might be in the wrong direction, demanding reorganization).

Thus, tension, conflict, and uncorrectable disturbance are good, but not in excess.

Bill Powers: Martin, you've sort of taken off at right angles to the line of thought I was developing. The "Coach" example was meant to illustrate how an apparent stimulus-response relationship (encouragement results in doing better) can lead to quite a different interpretation when explored from the viewpoint of control theory. I wasn't trying to generalize from the particular way I and (probably) others dealt with Coach's urging us to overachieve. With another person or in another circumstance, a similar encouraging remark leading to improved performance could work in a different way. But it will never be a cause-effect way. My point was that to test control theory, you have to think of possibilities other than the surface appearances.

Since I'm into high-school stories, I remember another instance with a mathematics teacher. I didn't much like or dislike this teacher—he knew his stuff but wasn't strong on making things clear. The class was doing an exercise, each person trying to prove a trigonometric identity. I was stuck—something was wrong, and I didn't know if I was even getting close. The teacher was going around the room seeing how everyone was doing. When he got to me, he said, "That's fine, you're almost there." This told me that I hadn't made any mistakes so far and was headed in the right direction. So I stopped worrying and went ahead and finished the proof, my first one. That felt nice. The 60th proof didn't feel so nice.

Apparent stimulus-response relationship: he said what he said, I then went ahead to reach the goal. Cause and effect? No. Information. I

wanted to know if I'd made some stupid mistake, and he told me (in effect) that I hadn't. With that information, I could stop looking for a mistake and devote my efforts to something more productive. I didn't finish because I liked the teacher or in order to please him. I finished because I wanted to be able to prove the identity. His remark wasn't a disturbance of something I was trying to control; it provided a missing perception so I could get unstuck from looking for a nonexistent error.

My Coach example was one in which the apparent stimulus actually did disturb something I was controlling for, and my response opposed the effect of the disturbance. The result was to put a very different light on what seemed like a simple S-R chain. That's all I was trying to show—not that there's something inherently bad about encouragement, or that being as pushy as Coach was necessarily leads to resentment and bad feelings. In fact I never resented Coach; not many did. He was a nice guy. I just resisted him. I regretted not wanting to live up to his expectations, but not enough to change my mind.

Regarding your comments on conflict: Conflict doesn't "lead to" anything in particular. What it leads to depends on how you resolve it or fail to resolve it. Most conflicts are unimportant; we just shrug and turn to something else, or we go into a little fit of reorganizing and think of a different way out. This happens all the time; we have natural machinery for resolving inner conflicts, and it usually works very well.

The degrees-of-freedom problem doesn't normally cause conflict because we've learned to use only those control systems that are compatible when working at the same time. The balancing of reference signals contributed by many higher-level systems isn't a conflict unless one of the higher systems is unable to keep its own error reasonably small because of the interference of other systems at the same level. The usual case is that all active higher-level systems keep their errors small, despite the fact that no one lower-order system's reference signal is the exclusive property of one higher-order system. The systems just find the analog solution of the simultaneous equations, and they all are successful.

When opposing muscles are used to control limb position, there's no conflict. In fact, there are two controlled variables that are independently adjustable: for the tendon reflex, one is the difference between the tensions in the two muscles, the other is the sum. The sum-of-tensions signal is controlled to produce a specific muscle tone. The difference signal controls the net applied force. Because the muscle is highly nonlinear, the sum (muscle tone) signal effectively alters the spring constant of the combined muscles near the zero-error condition, thus adjusting the static loop gain of the tension control system (and also the stretch control system).

Conflict is a problem only when it concerns some variable important

to the organism, is severe, and goes unresolved for a long time. That's what brings the clients to the therapist or counselor. Serious conflict destroys control or reduces its effective range to the point where it's not sufficient for the purposes normally served by the control systems.

A control system that keeps its error very small isn't likely to be "placid and content." It's able to keep the error small because it has a very high loop gain. This means that even the smallest disturbance will evoke an opposing effort, and that opposition will keep the controlled variable nailed to its reference condition. When you're driving a car along a mountain road with a washout on the cliff side, you tighten up that control system so the car stays precisely on the path you've picked to squeeze past the danger point. I don't think that "placid and content" describes that control system. But it's not in conflict, either: if it is, you have a problem because you won't be able to move the wheel as much as if there weren't any conflict.

There's a problem with your suggestion that "a system with tension and conflict will be more robust than one that is placidly content." The problem is that reorganization will start because of the chronic conflict. As a result, precise control will become impossible: the parameters of the control systems are going to be changing at random. What you get is a jittery and unpredictable control system that could literally do *anything* without warning.

Just because of neural response curves, I can believe that some slight amount of tension would help with rapidity of response to disturbances, because near zero signal, the slopes of the functions will be very low, and the loop gain will be low. But this is relevant only when the control point is set to zero and there are no disturbances. Most reference signals specify values of perceptual signals that are far from zero—somewhere in the normal range between zero and maximum. And there's normally some amount of disturbance to raise the error signals above zero, if only gravity. In those cases, there's no advantage to conflict, because conflict won't raise the sensitivity or speed of the system and will only reduce its range of control. I think that the best state to be in for possible action is one of alertness and calm. You should feel just a little zingy, but you certainly shouldn't be in white-knuckle conflict with yourself. You want everything working in the same direction.

So I guess I agree with your concluding remark: tension, conflict, and uncorrectable disturbance are good, but not in excess. I would figure something like five percent of the range of control. The rest of your reserve you would want to save for affecting the environment.

Some uncalled-for remarks on social conflict: In the background, I suspect, is an idea that competition is good for us. Up to a point, while it's fun, I agree. We like to set problems for ourselves and solve them, and get better at solving them. But competition as a way of life doesn't

work that way, except for a few winners. A social system based on serious competition is just a step from violence (in the United States, a very short step). The losers vastly outnumber the winners: we end up with a society of losers, winners being anomalies. In situations where the terms of the game determine that only a few can win, chronic losers can get very nasty; in fact, they tend to abandon whatever social principles there might be that make civilization better than life in the jungle. I don't think that the price is right. Competition—interpersonal conflict—is the lowest level of social intelligence. I don't like to admit that even a little conflict can be a good thing, because we've accepted a *huge* amount of conflict as good and natural for far too long. It's time to get smarter.

David Goldstein: Bill, can we follow through on your Coach example? What was the controlled variable for you, the degree to which Coach was pleased? Coach's comments led to your perception that he was not pleased. The increased effort was designed to increase the degree to which he was pleased. However, by making more of an effort, you caused yourself some physical discomfort and took some time away from activities which you enjoyed more. So you were really in conflict: you wanted Coach to be pleased; but you didn't want Coach to be pleased, because that meant discomfort and time away from more interesting activities. Suppose that you said to Coach, "I am doing as well as I want to for myself. If that really bothers you, I will be glad to quit." The Coach could say, "I want you to quit, it really bothers me." Or the Coach could say, "I don't want you to quit, it doesn't really bother me." In either case, you would be pleasing the Coach.

What would you have done with each answer? I don't believe that you would have quit, even if Coach gave the first answer. This suggests to me that you played football for several reasons other than to please Coach. I think you would have felt more relaxed about not putting out more effort if he gave the second answer. But you might have tried a little bit harder just to show Coach that you cared about his opinion, even after you made your remark.

What was the controlled variable for Coach? I guess it was a principle-level generalization, something like "never accept the initial effort, always prod the players to do better, and accept whatever additional efforts they make." Underlying Coach's comments, perhaps, was the thought: "I think very highly of you. I can see potential in you which you don't see in yourself." Coach was probably controlling for increased efforts beyond the ones players could make comfortably. No pain, no gain. Effortfulness. Commitment. Coach's comments led to your raising the gain. When a player did this, his performance was probably close to his potential. Coach wanted each player to do the

very best that he could.

Bill Powers: David, a conflict is expressed at the level where there are different goals for the same thing. I wasn't in conflict about liking Coach and wanting to please him, or about wanting to be doing more interesting activities. I even had some personal goals about getting stronger and getting better at athletic things. The conflict came when Coach pushed me *toward* one of my goals, and in fact *past* it. To be more exact, he made his approval contingent on my trying for a goal of physical achievement that was a lot higher than my own goal for physical achievement. To please myself and fit my athletics time in with all of the other things I had goals about, I made a certain amount of effort for a certain amount of time, and I was satisfied that I was doing pretty much what I hoped to do. Then Coach, for his own reasons, decided that it would be good for me to try harder, spend more time in the gym, become not just a social football player but a dedicated one, and so on. Maybe he saw some physical talents there and felt they should be developed more (of course that was what he was hired for and what he thought worthwhile in life).

The net result was that in order to maintain a good relationship with Coach, which meant mainly that this admirable guy would express approval of what I was doing, I had to reset my goal for athletic prowess at a level higher than what my own values recommended-at least temporarily. But doing that resulted in errors in my social life (too much time at the gym and football practice, more physical discomfort than I was willing to experience, a shift in self-image that didn't fit with my picture of me as a physicist, etc.). So I wanted to try harder and become better in order to please Coach (and get whatever other benefits would come from going that way, like being a football hero, scaring off people I was afraid of, etc.), and I wanted to try less hard in order to be more comfortable, have more time for my girlfriend, be with my other friends, tinker around with "scientific" projects in my room, and so on. It all came down to wanting to try harder (for one set of reasons) and wanting not to try harder (for another set of reasons). That was the focus of the conflict: I wanted to try harder, and I wanted to not try harder. I couldn't do both. My solution was probably a typical adolescent solution. I gave the appearance of trying harder without trying harder, and let Coach believe (or so I thought) that I just didn't have the talent he thought I had. At least I was convinced that he believed it, and so my conflict was resolved.

I could have quit football, but not physical education, which was required. And don't forget that one reason for going out for football (among several) was to please Coach! I didn't want to please him just to get him off my case. I liked him and admired him. The only

problem was that he wasn't satisfied by that—he didn't just say, "Glad to have you on the team." He did say that, to my great pleasure, but then he went on to demand more of me than I was willing to give. A great way to turn people off is to "encourage" them to do more than they want to do.

This certainly wasn't the only area of my adolescent life in which there was a conflict that rested on wanting to be approved of and liked, a conflict that led me to do things that caused errors in my self-image and self-esteem, but satisfied (or would have satisfied if there had been no conflict) other desires. I was always aware of these conflicts, but I didn't really have any good ways of resolving them. Finding those ways took me another 30 or 40 years of messing around at random.

One of the things I was trying to get across with my example (aside from the main one, which was reinterpreting an apparently beneficial cause-effect situation in PCT terms) is that "helping" people doesn't always help a whole lot. Like the adolescent me, most people are already in the middle of trying to fit their various goals into one coherent structure. When you try to force them toward what seems like a worthy goal, you inevitably cause conflict with other goals. You become part of the conflict situation. Of course you're trying to help, but you're forcing the person in a direction that person has probably already tried to go, or in which that person has gone far enough to meet the goal. If the person hasn't spontaneously gone farther in that direction, it's because doing so would violate other goals. If you really want to help, you'll help the person find out what is keeping that person from achieving all goals that look attractive, not urge trying for any particular goal just because, in your life, it has proven to be worth pursuing for you or for others. And helping doesn't mean urging people to go *past* their goals.

My life has been full of well-meaning people who just knew that I could achieve great things of *the kind they thought worth achieving*. If I'd gone along with all of them, I would have been a physicist, a writer, an athlete, a biologist, a neurologist, a cop, a teacher, a debater, a poet, a gardener, an engineer, a playwright, and so on-but just one of these things and nothing else. Of course, I was smart, so I showed a little aptitude in all of these directions. But I was never into heavy competition—I didn't want to be *the greatest* in any of those fields, or in general. All you have to do is show a little interest in someone's field, and that person becomes convinced that you share the same obsession and wants to do you the favor of helping you achieve fame and fortune in that field. People are really very generous in this way. But they aren't really "helping." They're really trying to validate themselves, their own choices of goals.

You say, "Coach was probably controlling for increased efforts beyond the ones players could make comfortably. No pain, no gain.

Effortfulness. Commitment. Coach's comments led to your raising the gain. When a player did this, his performance was probably close to his potential. Coach wanted each player to do the very best that he could." Probably something like that. It's a common viewpoint. It's also a narrow one, because what's a person's "potential"? Potentially, I could have been a great criminal. Potentially, I could have become a Hulk with deltoids like balloons. I could have become a pro football player. I could have become one of the world's great atomic physicists (at least one of my classmates did). People who see "potential" in you aren't considering your values, but theirs. They're also communicating, in a not so subtle way, that they don't think much of what you've done already. David, you have great potential as a psychotherapist (if you'd only just try a little harder). How's that grab you?

Rick Marken: Martin alluded to the potential value of a moderate level of conflict. Bill Powers agreed that some small amount of conflict might help in some situations. Bill says: "So I guess I agree with your concluding remark: tension, conflict, and uncorrectable disturbance are good, but not in excess. I would figure something like five percent of the range of control. The rest of your reserve you would want to save for affecting the environment." I'd like to point out that Bill's "five per cent" figure is based on experimental evidence. Nearly two years ago, I stumbled on the fact that people can control better when the disturbance to a controlled variable is caused by the output of another control system than when it is simply the result of causal processes. I had subjects do a tracking task where the disturbance (d(t)) was the output of a low-gain control system that was trying to keep the cursor at the center of the screen. This control system was in conflict with the subject, who tried to keep the cursor at another ("target") location on the screen. The subject always "won" the conflict, because the opposing control system had such low gain. What I wanted to show was that the output of the opposing control system would be dealt with by the human subject just as a disturbance -as though it were simply drawn from a table of numbers in the computer, as usual. So I did one tracking session with d(t) generated by the opposing control system. I also saved this d(t) in memory. Then I did a second run using the d(t) from memory as the disturbance—the *same* sequence of numbers that had been the disturbance during the first run. Performance (measured as RMS error or stability or whatever) was *always* poorer with the replayed (or non-actively generated) disturbance. This was a *very* surprising finding; it was dubbed the "Marken effect"—which made my kids very proud.

Bill Powers discovered the explanation of the Marken effect. It turns out that it requires no changes in the PCT model, just the recognition that there are transport lags in control systems (we rarely build trans-

port lags into our simulations, but we should). The "actively generated" disturbance (from the conflicting control system) acts a bit like a spring, allowing dynamic stability and, thus, better control. Once d(t) is generated and replayed, there is no possibility of moment-to-moment adaptation to the subject's dynamics by the opposing disturbance. Bill (and I) confirmed that a control system with a transport lag (I forget the value—I think 100 msec) exhibits the Marken effect, just as subjects do.

Bill suggested (and I confirmed) that you might be able to get improved control in a tracking task if you add the output of a conflicting control system to the "inanimate" disturbance in a tracking task. The gain of the conflicting control system must be low, of course, and the optimal value of the gain produces output that contributes about five percent of the total variance of the effective disturbance to the controlled variable. That is, if q = h + d (where q is the cursor, h is subject output, and d is disturbance), then in the "improved control" situation, d = de + dc, where de is the regular environmental disturbance and do is the added effect of the active output of a conflicting control system. Adding do to de *improves* control if do contributes only about five percent of the variance to the variance of d.

So conflict can help people control—but the gain of the conflicting system must be very, very low. If the conflicting control system were a person, he/she would be very unhappy, because he/she would *always be losing*—he/she would not have any control of the variable he/she would be trying to control.

So I heartily agree with Bill (again) that it's probably best not to harp too much on the presumed value of conflict; there is *far* too much interpersonal conflict already, and .the kind of conflict that seems to be of any value (like the kind in the Marken effect) requires that the gain of one system be so low that people would never want to be that system themselves; weak artificial control systems would. Be best in that role.

Martin Taylor: Bill, I guess I went in an orthogonal direction from what you had intended with your "Coach" story because it triggered things I had wanted to get onto for some time. But your response is also orthogonal to what I had in mind.

You have talked about reorganization as being a consequence of continued, sufficiently bad "intrinsic error." As I understand "intrinsic error," that would make reorganization a whole-system thing. But we had got so far last month as to agree that it had to be modular, and I was working on the presumption that reorganization within a module (a fuzzy module, not one with clear boundaries) would be occasioned by the continued sufficiently bad failure of the module to satisfy its various references. Under those conditions, we don't get a jittery and unpredictable system that could do anything without warning, at least

unless the modules concerned are quite high-level. Most of the hierarchy will still be quite stable.

I totally agree about the problems of social competition. We have far too much of it, and it is an article of faith for many in North America that competition is good. And I do believe that some level of competition is good. Without it, we would have a super-stable non-evolving society such as perhaps might have been in Europe before the Black Death, or in Egypt under the middle Pharaohs, or in China for millennia under the stifling civil service aristocracy. Such a society is not robust against new challenges and does not react quickly to disturbances, any more than does an undisturbed control system-I note your comment about high-gain control in a tense situation.

Rick Marken: A private post from Martin Taylor made me realize that you folks out there are too smart to let me get away with a mistake I made in my description of the Marken effect. I said that the conflicting low-gain controller was trying to keep the cursor in the renter of the screen. This was not correct (although it was correct for the "improved control" situation, where the output of a conflicting controller is added to an environmental disturbance). What I really did was have a subject try to keep the cursor on target (near the middle of the screen) while the conflicting controller tried to move the cursor back and forth randomly. I made the reference input to the conflicting controller a smoothed, time-varying random variable-just like the one that we ordinarily use for the disturbance itself.

In his private post Martin said that he didn't understand why the conflicting controller created a disturbance. Hopefully, my explanation about the "varying reference" in the conflicting controller explains this. Martin, you are right-if the conflicting controller had a fixed reference, then it would not be contributing a varying disturbance for the subject to counteract. By varying the reference of the conflicting control system, the system varies its output to try to get the cursor to match the reference—and since it has low gain, it does a poor job of it. But its varying output provides a nice disturbance to the efforts of the human controller. When this disturbance is replayed, the subject's control is poorer than it was when the *same* disturbance was actively generated, often by a factor of two or more.

When the output of a conflicting controller was added to the disturbance in a tracking task (d = de + dc, where de is the regular disturbance and do is the disturbing output of the conflicting controller), then I had the reference of the conflicting controller fixed. I just realized that this means that the variance of d will be slightly less than the variance of de alone, so any improvement in control using d rather than de could be attributed to the reduced variance of the disturbance. I'll have to do some

more research to show that the improvement is due to the addition of de. I think it is a result of adding dc, not just the result of lower variance of d. I think so because if you make the gain of the conflicting controller too high, then there is the expected degradation of performance that comes from being in conflict with another control system—and when the gain of the conflicting control system is high, that control system is acting to reduce the variance of d considerably. So there is a performance decrement, even though variance of d is reduced. But I should do some more research on this. I should be able to do the necessary studies this weekend. I'll let you know how it comes out if you are interested. This is why I need graduate students, darn it.

Bill Powers: Martin, I think we agree that some low background level of reorganization is a good idea. To that, I could add that at the higher levels, where we are on the leading edge of evolutionary development, reorganization might be one of the main ways of groping for control. When reorganization shuts down at the highest level, creative life is finished. I suppose I harp too much on conflict (for reasons with which you evidently agree). We shouldn't forget that control can fail for other reasons, such as confusion, or lack of skill or knowledge. Simply developing the hierarchy is a massive job of reorganization.

Rick Marken: There is no escaping the fact that when the big guy created life, he placed us squarely in the middle of a frustrating paradox—we live by controlling, but we cannot control what is living. Because we are control systems, we cannot be controlled; and because we are control systems, we cannot help trying to control.

PCT is a tough sell because people want to understand things so that they can control better. It is difficult to convince people that things will go better (with other control systems) if they don't control (or, at least, control with a bit less skill). Still, while PCT is a hard sell, I am now convinced that it is very important to, if not sell it, at least make it available to those who might profit most from understanding it; i.e., everybody. Some people will resist these ideas-and even become rude and unpleasant in their efforts to remove the disturbance. But I think it is our responsibility to at least put these ideas out in front of purple, in as clear and convincing a way as possible, without compromising in order to "sell" it. Just give it a chance and understand that nasty replies or reviews are not personal attacks, but the understandable efforts of other control systems to protect principles and system concepts that they consider important.

More than ever in my lifetime, it scams that the world is bound and determined to solve its problems by controlling people. It seems even more insidious now, because this strategy is less obvious than it once

was—when we had clear-cut dictators like Hitler and Stalin using this strategy to the chagrin of most civilized people. Now, our enlightened society thinks its problems come from the fact that we have let people get out of control. So the proposed solutions are more laws, more police, more jails, more regulations, more death penalties, and stricter moral codes—control, control, control. The idea that it might be this orientation toward control that is causing the problem does not even seem to occur to most people. I hear very little serious talk about programs that would "empower people," helping to *give* control: education, work training, child care, cooperative work programs, community centers, insured medical care, etc., etc.

The only objections I hear to solutions that involve controlling others come when controls are suggested for limiting competition; the goal seems to be to have control over other people, unless this control limits conflict. This is a "kinder, gentler" society?

I think it's worth it to try to help people understand their own nature as control systems. If people don't want to understand it, then, fine, we are no worse off than before. But I think that the potential benefits of understanding PCT outweigh the potential unpleasantness associated with trying to teach it.

Joel Judd: There is still a feeling that religion tells people what to do; there is a lot of prescriptivism to the Bible and other scripture. People in general, not just PCTers, often have an aversion to being told what to *do*, even when it might save a life or prevent injury, for example. However, I think that there can be some divergence at lower levels, but convergence at higher levels. In religion, this would relate to getting to "Heaven." But let's use a more mundane example. I'm getting a degree in Education. So is the guy down the hall. But his five years have been spent learning about and practicing counseling psychology, while mine have been spent studying neuropsychology and teaching English as a Second Language. Yet we are both getting Education degrees. We both had to enroll, pass preliminary and final exams, submit a dissertation, pay the fees, etc. Yet none would say that we *did* the same things. There are requirements that *everyone* must fulfill, yet much leeway in how they are fulfilled.

Returning to religion, I once read a comparison made by a church leader between the seemingly "rigid" requirements of religion (Christian, in this case) and natural phenomena. People balk at the idea of "requirements" to get to a higher place (or perhaps they balk at the idea that a *man* purports to know what these are-that's another problem). Anyway, he said that we shouldn't be surprised that a God would place requirements on us, as we can see limits placed on things all around us. For example, water boils at 212°F (assuming we're not trying to make

cocoa on Everest, of course). We can heat the water any way we want, as long as the water's temperature reaches 212°F. Dancing around the pot and chanting doesn't work.

My basic question is-and this sounds familiar-why not high-level convergence, and low-level divergence (ignoring for the moment the "who's going to decide which high-level values" problem)?

Rick Marken: What I was trying to say in my previous post is that there is no way to *make* society better—that is, to control it—other than by recognizing that society is made out of individual control systems that work best (and, I believe, work together best-this is my guess) when they are all able to control what they need to control; that is, when the set of 250,000,000 simultaneous equations (for the U.S.) can be solved for all of the unknowns (each equation's controlled variables) simultaneously. The PCT orientation is to help people *control-and not* judge whether or not you think it is something they should control. (Of course, you can't help making that judgement if their efforts to control interfere with your efforts to control; when that happens you are probably running into the degrees-of-freedom problem—not enough resources available to allow everyone to control. The PCT solution to the degrees-of-freedom problem is not very original: population stabilization and non-piggy resource usage.)

Greg Williams: Joel Judd says: "However, I think that there can be some divergence at lower levels, but convergence at higher levels. In religion, this would relate to getting to 'Heaven."' But, speaking purely empirically rather than normatively, it appears that there are wide divergences in notions of "Heavens" and about whether getting to one of them is desirable.

Bill Powers: The religious thing seems to be coming up again, with the usual sniping between the True Believers and the Unbelievers. It's obvious that the Unbelievers are not suddenly going to be converted to Control Theory for Christ, and that the True Believers are not going to switch from *being* believers to *studying* believers. I don't think that railing against a belief is going to advance PCT much, nor is blindly defending any particular belief going to win the day. Perhaps what we might more profitably do is examine belief as a phenomenon.

Belief is a phenomenon worth studying, quite aside from what is believed. What is most interesting is not just a single belief-there will be a sunrise tomorrow—but a *system* of belief. A single belief is usually defended for rather simple reasons: it's hard to find an alternative. But a system of beliefs is an elaborate thing that has the power to take over the mind and shape every aspect of experience to fit it—perceptions,

goals, and actions.

In Perceptual Control Theory (PCT), and even more in Hierarchical Perceptual Control Theory (HPCT), we attempt to build up a concept of how individual human systems work. In trying to learn and improve this theoretical system, we have all come up against our own beliefs; those who have spent years in conventional disciplines have often found their private confrontations of the new with the old unsettling, painful, and even costly.

It seems that simply growing up in a normal educational system, devoting oneself to study, learning what others have found, and meeting the demands of one's mentors is enough to allow systems of belief—or of unbelief—to get a grip that is hard to loosen. Consider the biologist's resistance to the concept of inner purpose. When children who are to become biologists do things on purpose, they take their own intentions, hopes, wishes, and goals for granted: the main problem is how to satisfy them. But put them through the series of educational courses that produces professional biologists, and they come out of it knowing in their hearts that organisms are just biochemical mechanisms with no purposes at all but survival to the age of reproduction. And not only do they "know" this, they *believe* it. To say they believe it means that they now consider their beliefs to be self-evident aspects of the world—not beliefs, but facts. They consider it their duty to inform the world of this truth, to reinterpret the descriptions offered by the misinformed so they properly acknowledge the purposelessness of life, and to deal with other people and more particularly animals as if they had no inner goals of their own. And, of course, they conscientiously interpret their own experiences so they fit the belief that purpose is an outmoded illusion—in their speech, as least, if not in their actions.

This phenomenon of belief isn't confined to biology. People arrive at firmly fixed belief systems about electron flow, quarks, continental drift, natural selection, grammar, etiquette, construction practices, and proper forms of music, art, poetry, and dancing. If you challenge their beliefs, they will defend them. In most cases having to do with less material beliefs, the ultimate defense is "I was raised to think that..."—and of course that is true, although it doesn't make the belief true.

Repudiating or even examining beliefs or unbeliefs is as much a social as a personal problem. To examine a belief or unbelief closely is already to devalue it slightly. To doubt it is to doubt all the circumstances that led one to adopt it in the first place. It is to question people whom one has admired, respected, submitted to, and loved. In effect, it is to see the truthtellers of one's formative years as liars, although of course they were telling what they believed to be the truth.

To question beliefs or unbeliefs is also to question the reasons for which one adopted, or once-and-for-all rejected, a belief. A belief in the ability

of one person to control another is not just an article of faith adopted because of love for the teacher, or rejected because the teacher was unpleasant. Believing in the ability to control others suggests all kinds of interesting possibilities if one sees the chance of becoming one of the controllers, and all kinds of horrifying possibilities if it looks as though one will be among the controlled. Beliefs are adopted or denied in part because of what they imply about one's ability to achieve other goals. They are, or at least certain details of them are, expedient in furthering one's own interests.

And finally (although not exhaustively), belief systems are intertwined with one's self-esteem. A scientist who believes in science above all doesn't hold this as an abstract belief. Along with it goes the consciousness that *I am a scientist*, that science is the best of all possible approaches to life, and being a scientist is the best of all possible ways to be. And, of course, those who reject science and choose some other belief system feel that they are among those living some other best-of-all-possible lives, while scientists are either neutral or the worst of all possible people.

The most serious conflicts that take place between people, and the most difficult to resolve, are those that originate at the highest levels of organization. It is not systematic belief per se, nor systematic unbelief, that produces the conflict, but the inability to step back and re-examine a belief when it is confronted by a contrary one. If the Jews and the Moslems come into conflict over their divine destinies, the productive thing for the Jew to do would be to say, "Wait a minute—my beliefs say that this land is historically mine, and you seem to believe it isn't, or that it's yours just as much as mine. How strange—these beliefs can't both be true. What's going on here?" Of course, that isn't what happens, because to most people a fundamental system of belief is to be defended, not examined. The defense, however, guarantees conflict to the limits of brutality.

At the level of systematic belief, both principles and reasoning become subservient to preservation of the belief system. If you look at the arguments against purposiveness in behavior that were advanced—and thought rather clever—in the early parts of this century, you find elementary logical errors and straw-man arguments that wouldn't convince a schoolchild if the subject were something else. You find abandonment of principles of scientific detachment and objective argument in favor of emotional attacks and innuendo. The belief system justifies these alternative uses of principle and reason, because, above all, the belief has to remain true. When you are defending something that is above logic and principle, logic and principle must be bent to the higher purpose.

I count belief and unbelief together as system concepts. There is

nothing inherently wrong with either—if there were, we wouldn't have evolved the capacity to form beliefs or unbeliefs. What goes wrong at this level of organization is loss of the ability to alter the organization of one's belief systems to achieve harmony among all the different belief systems necessary to a complete life—different belief systems inside oneself, and different belief systems among different people. I have not identified yet a higher level of organization than system concepts, but this might be entirely due to the fact that the currently highest level of consciousness is never itself an object of awareness; one must occupy a higher viewpoint to see that level as a level, an object of awareness, and a subject for potential modification. Even to speak of belief systems as belief systems, rather than as truths, implies, intellectually, that one is looking from a higher-level viewpoint. But there reason speaks; if there is no still higher level to which one can retreat, as there evidently isn't for me, the viewpoint can only be experienced as a ghostly sense of something just outside the range of peripheral vision that eludes the attempt to see it directly.

As I believe on all the evidence that I am not unique, I can only recommend that others who want to see belief systems as objects of study try to see them that way, thus occupying, if not being able to describe, this viewpoint from which one sees belief systems without identifying with them. To see them this way is not to accept or reject them, or to make them seem less than what they are. It is only to see them far what they are.

Bruce Nevin: Job's paradox, as paraphrased in Archibald MacLeish's verse play *J.B.:* "If God is God, he is not good;/If God is good, he is not God." Any superior intelligence, be it God or visitors in UFOs, cannot control humans and humanity, but can only influence. Bang! Right away, there goes occasion for fear of God or of any truly superior intelligence.

The principal method of influence is by suggestion. An important form of suggestion, whether explicitly in hypnosis or otherwise, is by nonverbal example. A possible PCT-paraphrase of the famous prayer taken up by the 12-step groups: Let me have the reference perceptions for controlling what I can control, for not trying to control what I can at most influence, and for discerning the difference.

Another very important form of influence is by presuppositions riding stowaway on agreements reached by more overt means, such as use of language. Sales techniques depend on this. So does socially institutionalized prejudice. So do most social conventions; only a small, visible minority of social conventions are normally available for conscious attention, those shibboleths that are overtly enforced.

Important among these conventions are those out of which we weave

the fabric of personality and self-image. I described some time back research done in which a few practiced speakers recorded the same text repeatedly, varying parameters of delivery and voice quality such as nasality, pitch variation, speed, orotundity, etc. Subjects evaluated these on graded scales for polar adjectives like fat / thin, honest / dishonest, and intelligent / unintelligent. All subjects perceived them as different people, and there was near unanimity in the judgements of the personality attributes of those imagined people.

It is my belief that humans unconsciously control for such variables in constructing a self-image for presentation to others. Certainly this must be so for choice of linguistic dialect; it appears to be so for a very great deal more. We unconsciously control our behavioral outputs in ways that are consistently interpreted by others. Some of this is social convention; some of it is probably biologically innate (smiling when pleased, as a family of gestures encompassing a range of such details). The forced "toothpaste" smile of a model in some ads reads false and might register pain and anger. The Madison Avenue appeal might then actually be to misogyny—whether the ad people know it or not.

We drop bait in the water and keep a watchful (but not consciously acknowledged) eye out for rubbles. We do this by deliberate ambiguity. There is a socially sanctioned interpretation of the interaction that is admitted to awareness. The other levels of meaning are available for awareness, but we choose to ignore them. I propose that this is the real function of patterns such as those Eric Berne and his students describe (games people play, games alcoholics play, scripts people live, etc.). They're not just to reduce anxiety by structuring time, as Berne suggests. They're auditions, means of trying one another out for roles in unresolved psychodramas. They're also opportunities for influence, because they are marvelously suited for re-framing at various levels. I suspect that any competent and experienced therapist does just this at least sometimes.

When I was at Penn in the '60s, I heard a story about someone coming across the Walt Whitman Bridge and paying for the car behind. Maybe the car following him got sidetracked to a different lane and the driver paying extra didn't notice, or maybe something more was intended. The toll-taker might have started it out of pocket on a whim. In any case, the next driver who came up holding out his fare, on being told, "The guy in front paid for you," said, "What the heck, I'll pay for the guy behind me." This reportedly went on for several hours before someone put his money back in his pocket. This could be an urban legend, though I have not heard it since.

Joel Judd: Bill says: "It's obvious that the unbelievers are not suddenly going to be converted to Control Theory for Christ, and that the

True Believers are not going to switch from *being* believers to *studying* believers." In my case, I agree with the first clause but not the second. I am interested in *believing*, which is why I tried to formulate the convergence / divergence question *about* belief, and why I framed it in terms of my own experience. The go-around last spring made it clear why someone is not going to suddenly switch belief systems, and that's fine. But that polemic ended with the call to be more "scientific" and find ways of understanding *concepts*. Regardless of the belief, there should be characteristics of control of *concepts* which can be examined just as control of other perceptions.

Bill also says: "...a system of beliefs is an elaborate thing that has the power to take over the mind and shape every aspect of experience to fit it... In trying to learn and improve... we have all come up against our own beliefs..." All the more reason to understand them. Would it be fair to say that even such objective topics as PCT are understood according to these belief systems? Obviously, I've been trying to fit it into mine, and judging from the comments, so have / are others.

I think what I would find useful is the development of an efficient way to get a handle on one's beliefs and their influence on one's actions—a sort of placement test, if you will. The method of levels has been discussed previously as a way of getting at higher-level goals, at least as far as one can recognize and verbalize them. What about going the "other way"? Supposing that one's belief about the nature and purpose of language is X, Y, and Z, how does one begin to be aware of how that system influences linguistic principles and the syntactic quirks one controls for, and so on, in a way that can be useful both for potential teachers and learners? Ed Ford has explained several times how he uses a procedure to help people become aware of what they're controlling for, and how this helps empower them to improve important relationships and resolve conflict. I am thinking that learning some things requires even more detail in terms of the perceptual hierarchy-another language, or adult literacy-there's a lot involved in making such changes in one's life. Obviously, such changes can be made. But how might we go about explaining such change in more detail?

Ed Ford: Bill says: "... I can only recommend that others who want to see belief systems as objects of study try to see them that way... To see them this way is not to accept or reject them, or to make them seem less than what they are. It is only to see them for what they are." The problem for me is that to be properly studied, understood, and fully tested, a belief system has to be checked out through experience. As a Roman Catholic, I have found great internal satisfaction over the years from the standards I've set and the decisions I've made which have flowed from my religious beliefs. I know others who have left my church and

established other beliefs. Some have found satisfaction in their lives, some have not. I think the standards I've set based on my systems concept, the choices I've made which reflected those standards, and, most important of all, the satisfaction that comes from achieving the various things for which I have controlled, are the real tests of systems of belief. It is pretty hard to see this system as an object of belief if, in order to validate it, you have to live it to test it. I think a valid test of any systems concept is this: Does it respect the rights and beliefs of other living control systems? Is it enough to judge a system of beliefs just by how others live it or by what it claims?

Perceptual Control Theory is a good example. Much of the understanding I have of PCT comes from my application of it within my own life, through my dealings with others, and through the success others have made of their lives through their understanding and application of PCT. It has given others a whole new way of looking at their fellow human beings and of respecting the worlds they know little about. I had to immerse myself in the concept and actively live it to really understand it.

Finally, we all have a belief system. It would be hard for my own view or systems of beliefs not to get in the way of those systems I'm trying to study. To me, the real test is when it is given a try, when the rubber hits the road. I guess it's the same as when many of you create a model of what you are thinking. A model for me is when people with whom I work attempt to find satisfaction by using a particular systems concept, *and*, through using this system, they are able to deal successfully with conflict. When people are functioning effectively, then whatever they're using to drive their system should be given respect.

Rick Marken: Rick here, from riot central [Los Angeles, after the Rodney King trial verdict was announced]. I spent the day at home today—work cancelled due to "civic unrest." Boy, are you social psychologists (and sociologists) missing some interesting interactions between living control systems.

I am motivated to begin another thread on social control—but frankly, I'm a bit shaken now. Suffice it to say that I want to talk about the fact that people don't think they are controlling other people when they are. For example, I have heard it said that it is not a control strategy to give people the option of working or living in poverty-it's their choice. I think this is disingenuous, and ultimately hurtful. But it does sound fair and humane—not like control. Just like operant conditioning, really: you can press the bar or starve, it's your choice. We even can be nicer and give you many ways not to starve besides pressing the bar; what could be fairer?

Dag Forssell: Bill says: "The religious thing seems to be coming up again... Perhaps what we might more profitably do is examine belief as a phenomenon." He is suggesting that we go up a level. I agree with Bill that there is *no* difference between *belief* in what we label religious areas and *understanding* in what we label secular areas. I find Bill's post lucid and indisputable—it hooks nicely into my system of understanding, that is.

Bill also says: "... I can only recommend that others who want to see belief systems as objects of study try to see them that way... To see them this way is not to accept or reject them, or to make them seem less than what they are. It is only to see them *for* what they are." Ed then says: "The problem for me is that to be properly studied, understood, and fully tested, a belief system has to be checked out through experience." Ed, as I interpret your comment, you do not mean to object to Bill's statement as such, but to emphasize the practical difficulty of passing judgement on some specific systems concept. You clearly recognize that both PCT and Roman Catholicism are systems concepts. You appear to me to support Bill's post, but you also appear to go beyond it.

You bring up issues of testing and validation of a set of systems concepts. In this, you express a point of view that I think is a good subject for discussion. This systems concept debate will not go away, because it is of great interest to many. We are each attached to our individual set of systems concepts. It illustrates the upper reaches of HPCT, which are of great concern to you and me and any others who try to learn from HPCT how to better teach or lead or counsel people.

Ed, you also say: "I think the standards I've set based on my systems concept, the choices I've made which reflected those standards, and, most important of all, the satisfaction that comes from achieving the various things for which I have controlled are the real tests of systems of belief." In my first reading of this, I understood you to say that systems concepts imply standards, and since the standards work and yield a satisfying life, this validates the systems concepts. However, I believe this last part to be a mistake.

You might not mean the second part the way I interpreted it at first, since you go on to say: "When people are functioning effectively, then what ever they're using to drive their system should be given respect." I think the interpretation that systems concepts validate standards (or "My standards work, therefore my systems concepts must be *true*") is an unexamined assumption behind most of the systems concepts strife we see in the world around us.

I want to focus this post on the standards. Perhaps in that I am "going down a level."

I would argue that the notion of validating or testing systems concepts is a mistake. It is not necessary, as you indicate in your last quote above.

I respect you as a thoroughly decent human being. I can never study, understand, and check out your belief system without living your life from its beginning. I do not want to, and it is not necessary.

To think that the standards validate a systems concept implies that those *standards* that do the validation are *unique* to that *systems concept package* (read "religion"). This is the implication I perceive and am debating. Perhaps I am punching a big hole in the air. That's OK, too.

I sincerely believe that if there are five billion people on this earth, there are also five billion systems concepts (of God and everything else). To a PCTer, it is obvious that systems concepts are individually designed by each person.

Just as we PCTers recognize that a diverse set of objects can with some advantage be categorized as "chairs," so a diverse set of umpteen million individual systems concepts with some common, perhaps even superficial, characteristics are called 'Roman Catholicism." Other sets are called "Mormonism," "Islam," "Hinduism;" "Secular Humanism," "Atheism," etc. This is good enough for wars.

It seems impossible to understand another individual's systems concepts in anything more than the most cursory categorization, and then we know that we really don't understand very much.

The point I want to make is that many systems concept packages support the *same* standards. Therefore, it does *not* follow that your systems concept package is validated by the success of your standards. I would be content to say (I think) that your systems concepts are validated by the simple fact that they are yours. Your systems concepts are yours, and that is *enough.*

It *does* make sense to advocate religious freedom and to declare that any religious notion is acceptable, as long as it does not violate important standards that have been agreed upon after more or less public debate over tens of thousands of years (often in the form of wars). If indeed principles / standards / values are what count, and most people on reflection and discussion will arrive at a similar set, it will not be surprising that there is a great uniformity in that area between all religions. In the course of history, many creative thinkers and founders of religions have postulated different systems concept packages on top of them. The *(same)* principles / standards / values used to create a particular systems concept structure logically could be expected to be derived from it.

It is also possible that a principle taught or experienced "on the way up" is remembered and used "on the way down" without being explicitly recognized as part of a system of concepts. We experience a lot as we grow up in our families, which stays with us as principles / values / standards without deliberate connection with, reflection on, or support by our religious beliefs. The idea that systems concepts imply standards

does require a deliberate effort to think things through. This should not be taken for granted!

It seems to me that the common inclination (if there is one) to validate your own particular systems concept package by the effectiveness of the (common) standards leads to some very unfortunate side effects.

The idea that the systems concept package is validated to be (rigid, objective) *truth* sets the stage for fruitless discussion, fights, and wars, since anyone who looks can see that the *other guy's* systems concept package is *false.* (Heretic is the word, I guess. Death to heretics!!!)

Religions as systems concept packages typically include whole superstructures of baggage in the form of miracles and explanations which at one time probably were designed to sell the packages to illiterate, ignorant people and keep them in check. Some of this creates unfortunate standards which prevent people from functioning well.

I have my systems concepts which flavor my interpretations. If a God created the Big Bang (today's news), fine with me. I do not recognize a God that can hear me. I think a pastor who tells people from the pulpit that if they can pray together in *His* name to put Jello gelatin "salad" to good use in their bodies—and they *believe* it—is doing these ignorant people a great disservice. Of course, they can pray for healing on Sunday. I have heard enough of this, as our family attended church regularly a few years back. We no longer attend. To me, this is part of the baggage that I personally object to as creating misleading and damaging standards. But then, as Ed says: "It would be hard for my own view or systems of beliefs not to get in the way of those systems I'm trying to study."

These packages may include some principles / values / standards that are not only misleading, but deny people rights we as Westerners take for granted. As Ed puts it: "Does it respect the rights and beliefs of other living control systems?" Consider women's rights under Islam. Since Islam is *true,* validated by the satisfaction of Muslim men, how can you question those things? By going "down a level" and recognizing that the systems concept is nothing more than a construct in your mind. It is not *truth.* There is no *truth* to be had anywhere. It is *all* subjective systems concepts.

I have bared a little of my prejudices here. Everyone has their own. The point is that, as I see it, the debate on creation has *nothing* to do with standards; miracles don't matter. A lot of the things we fight over in religion, between religions, against religion, and for religion do not matter; they are not essential to justify the *principles/values/standards* that *do matter.*

While I looked at my bookshelf of Thomas Jefferson materials, I was reminded of *The Five Thousand Year Leap,* by W. Cleon Skousen. This book by a constitutional lawyer and scholar spells out the 28 *principles*

which the American founding fathers considered as they formed our government (a systems concept!!!). It is very clear from this book that the American constitution is based in large measure on the political writings of Marcus Cicero, which were well-known to our founding fathers, *not* on the Judeo-Christian tradition, as we are told often by some religion salesmen.

A nasty thought crosses my mind in regard to some of these salesmen. To paraphrase Hitler's information minister Goebbels: "A point of view repeated often enough becomes the truth." Perhaps Goebbels is another historic figure who clearly anticipated William T. Powers. But Solomon said, "There is nothing new under the sun."

About systems concepts: PCT shows us plainly that all of our behavior is designed to create or (much more often) recreate perceptions we want. From the lowest motor control perceptions to the highest systems concept perceptions. We perceive that which we want to perceive. At the systems concept level, you can rephrase that to say we make come *true* that which we want to be *true.*

Five billion people are controlling to confirm that what they already individually *know* to be *true* continues to be *true.* Progress takes place only when people experience an error signal with regard to a system concept, where it fails to explain or satisfy. Then, a person is open to consider alternative principles which will adjust the existing system of concepts to a new, revised one.

It has been a few centuries since one person claimed to have and have read all books; to know all knowledge. Today, it is impossible to know it all. Ignorance is the rule. The only question is one of degree and area. I am comfortable knowing that I am ignorant in vast areas of knowledge. This recognition makes for a sense of wonder and makes it easier to be open to new information in all areas.

Ed Ford: Dag says: "... many systems concept packages support the *same* standards. Therefore, it does *not* follow that your systems concept package is validated by the success of your standards. I would be content to say (I think) that your systems concepts are validated by the simple fact that they are yours. Your systems concepts are *yours,* and that is *enough."* I think you are looking at this in a linear way. My systems concepts level is my highest level, out of which I create a set of standards, criteria, or principles which form the guidelines for the decisions I make. So far, this is all theoretical. The real test for anything is when the rubber hits the road.

When I teach, I believe all of my students should be treated as fairly as I humanly can. At the same time, I have established a standard within that "fairly" framework that limits the time for individual explanation or debate with one student during classroom time, which, if lengthy,

would deprive other students of needed instruction or role play experience. The decisions I make and the consequent actions I take with individual students are constantly monitored by me as I compare what I want to the variable I'm trying to control, namely the student / teacher interaction variable. So it isn't the standards as such that are or are not successful, but rather the entire behavioral process within my system as it evolves during my class. So it isn't whether the standards in and of themselves (or as they relate to the systems concepts) are successful, for they can't be measured independently of the entire behavioral structure that is the operational living control system. Rather, it is our whole system operating as a continuous process. This involves a whole bunch of things that are all interlaced, interactive, and interrelated, each being a part of the whole process. I might have to adjust my systems concepts (as when I learned PCT), or change a few standards, or alter specific goals or decisions, or change my approach to controlling the variable, perhaps by dealing in a more effective way with the various obvious and sometimes unforeseen disturbances. Systems concepts are validated not because they are mine, but because, over a period of time, I have found satisfaction and fulfillment through controlling and closing perceptual errors using specific systems concepts as reference signals. This is the real test of any systems concepts, I would think. This is where real success is measured. Establishing systems concepts, setting standards, and making decisions is only a part of this process. It also involves being able to control for the right variable at the right time, dealing with both foreseen and unforeseen disturbances, and learning to "listen to and deal with" our reorganization system, while at the same time contending with other conflicting reference signals and principles, both within our own system and in the various systems around us.

You also say: "Religions as systems concept packages typically include a whole superstructures of baggage in the form of miracles and explanations which at one time probably were designed to sell the packages to illiterate, ignorant people and keep them in check. Some of this creates unfortunate standards which prevent people from functioning well." Concerning the use of my own faith as an example, I promise you, I'll not do so again. As a person who, at the tender age of 65, believes in a personal and loving God, in prayer, in miracles (I actually witnessed one), and in spiritual growth, I can assure you my standards have not prevented this illiterate and ignorant person from functioning well. As to keeping me in check, my wife Hester and my children have been trying to for years, but with very little success.

Rick Marken: I think I have been making the mistake of sounding like I believe that people *can* control other people—and shouldn't. What I

mean is that people *try* to get other people to act as they (the would-be controllers) want. Of course, the controller is not *really* controlling; but the controller is acting as though he/she can control (and it looks enough like control so that people imagine that it can be done). The fact is, of course, that if you *really* try to control someone (make them do behavior X, no matter what), then you are simply placing yourself in conflict with that other control system. Most of what passes for social control is just social "influence" (manipulating a side-effect of control, for example by disturbing a controlled variable). When the controller becomes implacable (because the controllee fails to continue being influenced), then you get problems.

Bruce Nevin: Rick says: "Of course, the controller is not *really* controlling; but the controller is acting as though he/she can control (and it looks enough like control so that people imagine that it can be done)." This is complicated by the fact that people try to make and maintain social arrangements for cooperative action. This has the effect of people acting as if they were being controlled. The precursors of this are pretty basic in animal behavior, I think. Act in a predictable way around animals, and they get used to you. Act unpredictably, and they go on alert and can get quite upset. Social arrangements for cooperative action require predictable behavioral outputs of the participants, as though the participants were being controlled by one another or by the social arrangement itself.

On another tack, the other day I saw some books by Georges Bataille. In a pair of books with a title something like "the unbearable share," he (says the cover blurb) develops the notion that the converse of utility is at the root of social arrangements and culture. First, the paradox: on a utilitarian theory, in which X is justified by its utility for the sake of Y, the whole must be ultimately based on something that is useless. This neatly parallels the lack of reference perceptions (I almost typed "reverence perceptions") above the highest observable level of the perceptual hierarchy. He builds up his theory on the notion that useless things like potlatch, conspicuous consumption, and eroticism are more fundamental to culture and history than control of the means of production, etc.

Greg Williams: As I've said before, PCT isn't a single-edged cutting (through the crap') implement. Mapping out others' control structures using PCT techniques (particularly the Test for Controlled Variables) can be preliminary to manipulating the activities of those structures, as well as to "empowering" them. I hope some other PCTers will admit how effective PCT tools could be in the hands of the "predict-and-control" folks, and quit burying their heads in the comforting sands of

verbalisms like "there are no social control systems." (True, but not very comforting when you realize that Big Brother might prefer to let you go on controlling as you wish, but with *skewed* premises. And how does Big Brother decide on which premises to skew? One efficient way is to learn about parts of your control structure by applying the Test for the Controlled Variable.)

The last time I brought up this issue, Bill Powers suggested that such manipulations in the light of (partial) knowledge of what others tend to control for are doomed to be "short-term" only. But Bill said that "short-term" could mean many years. Ulp!

Rick says: "Me fact is, of course, that if you *really* try to control someone (make them do behavior X, no matter what), then you are simply placing yourself in conflict with that other control system." What I am getting at above is that it is possible (to a degree, and certainly within limits), by using the Test, to reduce conflict with another's control structure while manipulating that structure to want what the controller wants and not what the structure would have (hypothetically) wanted in the absence of the controller's manipulations.

Dag Forssell: Ed, you say: "So it isn't the standards as such... for they can't be measured independently of the entire behavioral structure that is the operational living control system." I agree with you. The standards certainly fit in a framework. They are at the 10th of 11 levels in the HPCT structure, as presently defined.

You say: "Rather, it is our whole system operating as a continuous process. This involves a whole bunch of things that are all interlaced, interactive, and interrelated, each being a part of the whole process." No argument here.

You say: "I might have to adjust my systems concepts (as when I learned PCT), or change a few standards, or alter specific goals or decisions, or change my approach to controlling the variable, perhaps by dealing in a more effective way with the various obvious and sometimes unforeseen disturbances." You are describing the HPCT hierarchy and noting that you carefully consider how it all ties together in order to function well. We are in perfect agreement. The careful consideration is an important point.

You say: "Establishing systems concepts, setting standards, and making decisions is only a part of this process." Yes, only the three highest levels.

And you say: "It also involves being able to control for the right variable at the right time, dealing with both foreseen and unforeseen disturbances, and learning to listen to and deal with' our reorganization system, while at the same time contending with other conflicting reference signals and principles, both within our own system and in

the various systems around us." As I read you, you are describing the essence of the "behavior of perception" in a dynamic environment, and noting how reorganization fits into the picture when normal operation is not enough to control the error signals.

As near as I can tell, we are in perfect agreement—in part because I have learned from you. Since each of us has our individual construct of HPCT in our own head, we will never have quite the same concept of HPCT or anything else, or the same way to explain or think of it.

I still feel that it is more fruitful for human interaction to focus on principles / values / standards as a *subject of discussion*, and I would like to point out that unless I have misunderstood you, this is precisely what you do when you ask a counseling client, "What are your priorities?" You don't ask, "What is your understanding about life?" or "What are your beliefs?" or "What is the meaning of it all?" The systems concepts are a very large network of understandings. It is unmanageable to question systems concepts directly in therapy. You would get trapped in a labyrinth and never get out. The standards are both more relevant and more accessible.

I grant you that the person might look into his / her systems concepts to answer the question, "What are your priorities?" But perhaps not; the problem might be that the person has not spent much time to integrate a set of systems concepts, depending instead on fragments of principles / values / standards as taught by and absorbed without deliberation from parents, peers, siblings, teachers, etc. Perhaps your question about standards requires the patient to think about the systems concepts deliberately for the first time in a long time and create some. You teach PCT, which provides a good framework for that process, without being (or appearing to be) offensive to whatever pre-existing systems concepts the person might have.

I read into your post another aspect of your therapy: If the person does not know how to solve a problem (program and sequence levels), even with newly considered (reasonable) standards, the system does not work. It is an integrated whole! Then you have to teach how to solve a problem, starting with one that has a chance of success. Eventually (hopefully) the person learns to function better at all of the (integrated) levels.

Many things have come together to shape my systems concepts.

Ever since Luther gave Gustavus Vasa an excuse to grab all of the Catholic gold in Sweden in 1523, Sweden has had a Lutheran state church. From first grade through junior college in the public school system, I had two lessons a week in "Christianity." In the later years, it amounted to "comparative religion." I was introduced to the basic tenets of all the major world religions. This is conducive to thinking of them all as systems concepts—with malice toward none, with charity

for all—and seeing that one of the major purposes of religious teaching down through the ages has been character education: teaching standards, so that people can function well.

In science and engineering, I have understood since high school biology that the *only* way into the human nervous system is through the nerve endings of the various senses. With this perspective, it is clear to me that it's all perception. I did not need Bill Powers to make that a part of my systems concept. PCT suggests one way to imagine the specifics. Whether it is done on one level in one massive neural network or in 99 levels of hierarchy is immaterial to the basic premise: it's all perception.

In the past year, I have read Thomas S. Kuhn's *The Structure of Scientific Revolutions.* It could just as well also be titled *The Structure of Religious Revolutions.* Kuhn makes it abundantly clear that to understand a system of concepts, you must internalize that particular set of concepts. When you have done that, you will see and understand the world through the eyes of those rules, that "paradigm." If it works for you (at least reasonably well), you make it your *truth* and defend it against all comers.

I have a tape by Marilyn VanDerbur which includes a quote from Joan of Arc. Joan has been offered her life and liberty if she will only take back what she has said; deny what she believes in. Says Joan: "The world can use these words, I know this now. Every man gives his life for what he believes. Every woman gives her life for what she believes. Sometimes people believe in little or nothing, and yet they give their lives to that little or nothing. One life is all we have. And we live it as we believe in living it, and then it is gone. But to live without belief and purpose, to me is more tragic than dying. Even more tragic than dying young."

A few years ago, I read Bertrand Russell's A *History of Western Philosophy* and enjoyed the TV series "The Day the Universe Changed," by James Burke. It is clear to me that *many* systems concepts, explaining the world around us, have been used, lived by, and died for down through the ages in Western Civilization. It is also my perception that many of these still are in use, handed down through different religions, cultures, and oral traditions.

I think that to say, as Ed says, "... we discover... the true outcome of being human in a real universe" is another way of saying that our systems concepts (the creation of realities in the right way) are validated by our ability to function well, which is Ed's point in the first place. If we develop a reasonable set of systems concepts and reasonable standards to go with them, then we will function well in the Boss Reality. To wit: If we have adopted standards for a good diet, we have a better chance of maintaining health than if we depend on Jello and prayer. Let me

mention that I am in no way against prayer. I think, rather, that it is the atheist who refuses to engage in introspection and quiet dialogue with himself / herself, as an anti-religious posture, who loses out on that deal. It is the ignorant dependence on Jello that saddens me, and that is a question both of systems concepts in regard to the understanding of nutrition, and of standards in applying the knowledge.

To say that it is *all* perception seems ridiculous to a person eating breakfast. The world is real enough. Indeed, in millions of experiments since we came of age, we have hardly ever failed to touch an object as intended. The reality is palpable. We grab the cup. The coffee is hot.

A few months ago, Gary Cziko posted an experiment, which I have adopted. (Thanks, Gary!) Ask a person, while seated, to cover one eye and push on the other while gazing across the room. All that happens is that the image moves sideways a little. Then ask the person to stand up on one leg. Challenge the person to remain standing. Repeat the experiment. The point is that our senses are so well calibrated that we fail to notice the difference between the actual and the perception of the actual. But the moment we push on the eye—a sensing instrument—the difference becomes obvious.

At a higher level, I have adopted Ed Ford's discussion of the concept of wife. It is quite fun to tell the story of how Christine and I met in a whirlwind of fun, and, after three weeks, I said: "I love you, do you want to be my wife?" She answered: "I love you, I want to be your wife!" My concept of wife was based on seeing my mother slave away in the kitchen, taking care of six kids. Christine's concept of wife was based on seeing her mother shopping in London once a week, with the household handled by six servants. How long was the marriage likely to last?

So far, we have shown that it's all perception at the lowest levels and at the intermediate levels in the hierarchy. Why should anything be more than perception at the highest level? How could you *possibly* build certain truth on a foundation of uncertain perceptions? No, it's all perception; all the way up.

Since the dawn of human experience, people have no doubt tried to make sense of their experience, to suggest systems concepts which can explain. In the realm of human behavior, among those many concepts are (1) that God makes us do what we do; (2) that our Soul makes us do what we do; (3) that impressions of our environment (accumulated and presently impinging on us) make us do what we do. Then there is (4) HPCT, which says that our purposes in comparison with the environment make us do what we do.

Through loud shouting matches on this net, we know quite clearly that HPCT is not compatible with the environmental behaviorism S-R. S-R is purely a machine concept, directly at odds with the notion of God

or Soul. We do not mention that PCT is also not compatible with the idea of any one particular concept of God or Soul as *objective truth* or Boss *Reality*. It's all perception. However, the concept of God or Soul is quite compatible, I think, and perfectly respectable as an individual person's personal systems concept. All that is required for compatibility in every direction is for an individual to recognize and acknowledge that it's all perception.

As organisms, we learn *only* from experience. Our *only* source of information is the intensity (or energy) signals we experience from our nerve endings. With a head start in the structure our genes have instructed for the biological machinery, we construct an understanding of those experiences in our nervous systems. One advantage we as humans have is the spoken and written language. By way of language, we can share the experiences of others and thus accelerate and multiply our individual experiences. Still, this all has to enter through nerve endings.

Ed, I do not mean to pick on you, but by way of your own example: If Ed has read or been told about a miracle, that is a perceived experience. If Ed has personally witnessed a miracle, this is a perceived experience just the same, subject to Ed's perceptual capability and interpretation. Ed does the perceiving through nerve endings and construction of an understanding in Ed's mind in either case, and both are subjectively real to Ed. No one has any business questioning Ed's reality. It is his. As I said in my previous post, I think it is obvious that there have to be five billion individually constructed systems concepts among five billion people.

PCT requires a lot of reorganization and takes a long time to grasp, because it provides a complete perspective which is not really compatible with many of the systems concepts people have used with various success since time began. Things will be much easier 50 years from now, when PCT is taught in elementary school and all the way up. (Unless fundamentalists catch on and object, of course). When that happens, the world will be a better place for our grandchildren. That is worth living, working, and dying for!

In the meantime, I believe that discussion of particular systems concept elements as *truths* is pointless, but that it can be very fruitful to focus on the standards which have a much greater universality and direct impact on the functioning of an individual control system. (They are, after all, one level closer to where the rubber hits the road).

It's all perception!

Rick Marken: I think this discussion could be cleared up for me a bit if Ed or Dag could tell me what the word "standards" means in this context. I think of standards as specifications—so, for me, "standard"

is a synonym for reference level for perceptual variables. Ed and Dag seem to be using the word "standard" to refer to a type of perceptual variable (like a principle or system concept). What do you mean by "standards"?

Dag says: "... one of the major purposes of religious teaching down through the ages has been character education: teaching standards, so that people can function well." Are they teaching you how to perceive "standards"—like "thou shalt not X, and thou shalt not Y are examples of standards, kiddies"? Or are they teaching you where to set your references (standards) for certain variables that the church assumes you can already perceive—like "I know you can perceive many different gods, but you better set your reference for perceiving YHWH as numero uno, or fry, bubby"? I think that Dag meant that religions teach standards in the second sense: "set your reference for these perceptions here, or else." Is this correct?

I would suggest that religions do try to teach people where to set their references for certain perceptions. I think this is not a good way to help people function well—in fact, it is just about the worst thing you can do to many people. It would only help if (1) everybody perceives the words in the same way, (2) everybody uses words exactly the same way in describing those perceptions (so that everybody knows an "abomination" when they see it), and (3) everybody lives in a world that produces exactly the same disturbances for everyone, so that certain reference settings are always the right way to correct for disturbances of higher-level perceptual variables. I think it's safe to say that the probability of any one of these conditions being met is close to zero. The probability of all three being met is thus zero times zero times zero equals zero. This is my estimate of the probability of religion being a reasonable solution to the real-life problems of any individual living control system.

But it's worth a try.

Dag goes on to say: "If we develop a reasonable set of systems concepts and reasonable standards to go with them, then we will function well in the Boss Reality." I would rather say that what we develop to function well in Boss Reality are *control systems*. We develop means of perceiving and of influencing the perceptions such that they are controllable. Unquestionably, there are ways to perceive and act that make control impossible; the solutions we develop for controlling our perceptions are constrained by boss reality. I must, for example, learn to exert forces on the steering wheel that bear a particular relationship to my perception of the angle between my car and the road's center line in order to control that angle. But there is not a "right" way to set the references for that force, since the amount I exert depends on continuously varying disturbances acting on the car.

Dag's statement implies that there are "reasonable" ways to set references (if standards mean references) for perceptual variables. If this is what he means, then I must disagree. Reference settings depend on the goals of higher-level systems *and* on disturbances to the variables controlled by those systems—there is no one "reasonable" setting for references at any level of the hierarchy. There can't be—and imagining that this is so can lead to internal conflict, interpersonal conflict, or self-destruction (I think that's what happened to Joan of Arc—lack of willingness to adjust a reference to control another variable. She imagined that there are absolute references. That's her choice, of course, but as for me, give me liberty or let me outta here).

Dag says: "To wit: If we have adopted standards for a good diet, we have a better chance of maintaining health than if we depend on Jello and prayer." Maybe, maybe not. "It's all perception," and all you do is control perception. If you can control the perceptions you need to control with Jello consumption, then it's fine—chance has nothing to do with control. You either control the perception or you don't-and you reorganize. If prayer works to control the perception you are trying to control, then great—if not, not. No chance involved.

If one eats vegetables to increase their chance of living longer, then I think they are controlling an imagined perception. If one eats vegetables to feel better—and they feel better when they do eat veggies and worse when they don't—then they are controlling some perception or other, and that's fine. Some people eat steaks and wash it down with a whiskey to successfully control the same perception. There are many ways that can (and, because of Boss Reality, sometimes must) be used to control the same perception. I think it's just important to be sure one is controlling perceptions and not just imaginations, because the perceptions could be getting out of control behind one's back.

Yes, Dag, it is all perception. But we have to live with the fact that we want some of those perceptions to be a certain way. We want to control them. And to do that, we have to be able to develop systems that will take into account the constraints of our own nature (the fact that we are controlling many perceptions at the same time) and the constraints of Boss Reality. And a control system only works (controls) if it can vary its output to compensate for disturbances to the controlled perceptual variables. These outputs are often references for lower-level perceptual variables; so the last thing you need in an effective control system is a "pegged" output-one that does not vary. A control system that believes that there is only one reasonable output (reference) value for another control system is, to my way of thinking, nothing but a big problem-whether that control system exists within our own hierarchy or in someone else's hierarchy. Control systems that think

that there is just one "right" reference value for a perceptual variable are the control systems that really need to learn PCT!

Dag Forssell: Rick asks: 'What do you mean by 'standards'?" I have tried very hard to make the connection to the principle level. The word "value" is in there too. To Ed, it is at the level of understanding and belief, if I understand him correctly. I think it belongs at the principles / standards level, if it belongs at all. It signifies a judgement as to what is important among the things you understand / believe.

Rick says: "I would suggest that religions do try to teach people where to set their references for certain perceptions. I think this is not a good way to help people to function well—in fact, it is just about the worst thing you can do to many people." As I have talked to you and have read your posts for a long time, I have gotten the impression that you think that "people will do what they will do," regardless, and that, as a fellow human being, you have no business influencing them. You did admit to me once that you just might have influenced your kids along the way. How? Did you, perchance, teach them where they might profitably set their reference perceptions, so that they might function better? Dr. Spock told a generation of parents to leave their kids alone, and let them do whatever they pleased. I suppose those kids earn the highest incomes and have the happiest marriages now. Surely they must function well,, since no one tried to "control" them when they were little. I think that just about the only thing that separates humans from other animals is the ability to suggest reference perceptions which the young can adopt because they choose to.

Greg Williams recently commented on the tendency of PCTers to bury their heads in the sand when it comes to "social control." Influence is a form of social control, for sure. Why be afraid of it? Influence is for real, and it is important. The world is not populated only by well behaved, adult, PCT-academics, who object to being "controlled" by others. To pretend that positive influence through teaching "standards" or "principles" is (1) impossible or (2) bad is a cop out. Parenting, management, teaching, leadership, and counseling are about that.

When you make an earnest effort to help people manage themselves better, because they have hired you for that or because they are your kids, you are faced with the real question of how to influence them positively and effectively. You cannot duck and talk theory alone, but it sure helps to have a good one. You cannot afford the time and confusion of dealing with everything all at once. You have to figure out a good place to start. I know of no better application of PCT and set of suggestions on that subject than in Ed Ford's book, *Freedom from Stress.* Have you read it? Ed shows how to question people so that they will reason with themselves, but he also suggests and teaches.

Ed is a master of positive influence.

I have wanted to try on the net my thought that the level of principles is key, and the suggestion that there are some well-defined, universally acceptable reference perceptions or "standards" that have worked well for a lot of people over time. Character education is, I think, a very useful form of "social control" that is vitally important, no matter where it comes from. Of course, it is also important that this same character education is not misused, as historically has been the case in many times, religions, places, and cultures. Greg might call it a double-edged sword. But the total absence is a disaster, for sure. That is why I think it makes a good subject for discussion.

Joel Judd: Rick says, regarding religions telling people where to set their references for certain perceptions: "I think this is not a good way to help people to function well... It would only help if (1) everybody perceives the words in the same way, (2) everybody uses words exactly the same way... (3) everybody lives in a world that produces exactly the same disturbances..." I think it functions very well if a religion has a "do all you can for others but be responsible for yourself" ethic at its roots. In this way, you try to point out to someone what kinds of things have worked for you and others, but you do not force them to act in your image.

The thing about principles that I think gets confusing sometimes is the distinction between how we label the principle and what we *do* that we interpret as reflecting it. I don't think there is anything wrong with telling someone, "Don't lie! It's bad." But there is always someone (invariably someone older and "wiser") who asks, "But what if the Gestapo is knocking at my door asking if there are any Jews in my basement?" Here we have a particular experience—not a common one, by the way—where I have no problem telling the officer 'No." But that doesn't make lying good! And my three-year-old certainly doesn't understand when I tell her, "Look, mistruths are generally not good, and telling them will contribute to a type of character most people don't appreciate, so you should always tell the truth, except when your mother asks you if her green hair is beautiful, or your friend asks you if her dying Mom is going to get better, or the Gestapo knocks at your door..." Besides proposing standards for people to follow, religions also usually provide guidelines against which to check your personal interpretation of the standards.

We *all* teach standards to others, whether we consciously recognize it or not. Being grown-ups and knowing so much about everything, it's sometimes tempting to let the benevolence in us make us reluctant to teach the things that really do bring happiness to people's lives, in the name of not infringing on their "rights" or "freedoms" or "autonomy"

or whatever.

Bill Powers: Rick says: "Control systems that think that there is just one 'right' reference value for a perceptual variable are the control systems that really need to learn PCT!" And Dag says: "Greg Williams recently commented on the tendency of PCTers to bury their heads in the sand when it comes to 'social control.' Influence is a form of social control, for sure. Why be afraid of it? Influence is for real, and it is important." Influence is not control unless you (1) insist that your influence have a particular effect on the other person, and if it does not, (2) apply whatever means is necessary to make sure it does have that effect.

Influences should be thought of as disturbances. That is, you can perform an act that by itself would alter the other's perceptual world if it were the only influence. But you realize that you can't determine the *outcome* of that act in the other person. We tend to use the same word, influence, for the act we perform and for its effect, just as we do with the word "disturbance." Setting an example is an influence, in that it presents a situation to another's perceptions. But it doesn't necessarily *have* an influence, in the sense of altering the other's way of behaving. Even if it does alter the other's behavior, that change might be simply a way of counteracting the influence, and will disappear as soon as the influencing act ceases. Of course, what we hope for is a more or less permanent change in the other's way of doing things—but that result comes from the other person's way of dealing with and understanding the influence. We can't make it happen from outside that person. So it's important in using the term influence to distinguish between the act we perform that's intended to have an effect, and the effect that actually results or doesn't result.

Parents influence their children by (for example) advice, commands, example, demonstration, and story-telling. Children generally being eager for new experiences and not being very sure of themselves in situations beyond their capacities, they normally latch on to these influences and adopt from them whatever fits their growing organizations.

If, however, they don't adopt some of them, or reject some of them, the parents might then resort to punishments and withholdings as ways of trying to make their influences have the desired (by the parent) effects. Then we get all the ills that result from concerted attempts to control other control systems. The children learn, in protecting themselves from direct external control, how to satisfy the parents' reference levels and thus remove the pressure. They learn to lie, dissemble, conceal, misrepresent, pretend, and otherwise give the impression of compliance while internally isolating themselves from

their parents. They become, in short, alienated from the adult world. Of course, a lot of the children simply buy into the system and save themselves all that trouble.

Social influence is not social control. But it's hard to learn how to influence (act on) other people while accepting completely that they will not be influenced (be changed) if that is their choice. When we exert influences on other people, hoping for some change in their behavior that's to our own liking, it often happens that there's no visible result. What do we do then? If we just try harder, we're falling into controlling another person, or trying to. If we give up, we haven't achieved what we want. It's hard to find the middle ground, where we give it a good try but on detecting serious resistance give a higher priority to respecting the other's will as much as our own.

I'm not saying that one should never try to control other people. If a kid runs out in the middle of the street, we whisk the kid to safety by whatever physical means is required. If we're being mugged, we do whatever is required to protect ourselves or those we care about. Not everyone goes around respecting other people's wills. We can't just pretend that everyone in the world subscribes to the same system concepts. Well, we can, but it's not always wise.

What really counts is our understanding of human nature. If we understand that all people are basically as autonomous as we are, then we wouldn't want to encourage a system in which autonomy is ignored or overridden by force as a matter of policy (the present most popular system). With that understanding, we try to deal with others in a way that encourages them to understand things the same way, and to realize that if they want to continue being autonomous, they have to support a system in which autonomy is generally accepted as a fact. Once you see that basic concept, you understand the problem we're trying to solve in our social interactions. There's always a conflict between what we want other people to do and what they want to do. If we begin by respecting the will of others as much as our own, there are certain kinds of resolutions of the conflict we will avoid using as long as possible. We will spend more time trying to find clever ways to satisfy all of us, and less time plotting how to get our own way regardless. It seems to me that that would be a pretty nice world to live in. I'd like to persuade others that it's worth a try. But of course I can't control them into doing so.

Rick Marken: Dag says: "As I have talked to you and read your posts for a long time, I get the impression that you think that 'people will do what they will do' regardless, and that as a fellow human being you have no business influencing them. You did admit to me once that you just might have influenced your kids along the way. How? Did you

perchance, teach them where they might profitably set their reference perceptions, so that they might function better?" I want people to be able to control their own perceptual variables as skillfully as they can without interfering with the ability of other people to control their own variables. To the extent that one can help another person (or child) to control more skillfully, that is great. I don't care what people want to control (as long as in doesn't interfere with what I want to control), I only want them to be able to control it. My motto is: a control system in control is a control system that's a pleasure to live with (unless that control system is trying to control you or the things you want to control, relative to different reference levels).

If we take the hierarchical control model seriously, then I don't see how anyone could possibly know how to tell another control system "where they might profitably set their own references for their perceptions." This doesn't mean that I would not suggest a reference (or force the results that would be produced by having that reference) under certain circumstances. The classic example is "wouldn't you tell your kid not to run out in the street?" You bet your sweet bippy I would (and did), and I would physically haul them back out of the street if they were in it—different references or not. But I certainly wouldn't say that what I am doing is suggesting a profitable reference setting for the kid. I'm suggesting ways that the kid might want to control the perception of getting hit by a car. If I could (which the model says I can't anyway) get the kid to have as a reference "don't run into the street," then what happens when the street is empty and is the only refuge from a group of bike riders barreling down the sidewalk? Sometimes the "running into the street" reference is good to have set at "yes."

And that's my point; the HPCT model says that there just cannot be a right or profitable setting for a reference signal; reference signals must be able to vary due to disturbances from the environment or the actions of other control systems. What is a good reference setting in situation A will be a bad one in situation B.

What is important in the HPCT model is not the particular setting of any reference (even the higher-order ones that you call standards), but the fact that references vary as part of a closed loop that produces *control* of *perceptions*. *Of* course, the HPCT model could be wrong, and there could be a *right* set of references at some or all levels. But I'd need some evidence before I reject a model that seems to work so well at making detailed, quantitative predictions of behavior. As it sits, the HPCT model rules out the possibility of "correct" references-except where "correct" is defined as that setting of the references that leads to actions which, when combined with prevailing disturbances, produces *control*. And this just means that "correct" is going to change all the time (sometimes you *must* run into the street, sometimes you *must*

not—if you want to *control* other variables).

Dag also says: "I think that just about the only thing that separates humans from other animals is the ability to suggest reference perceptions which the young can adopt because they choose to." What humans (and other animals) teach their offspring is how to *control*, not what level to keep a particular perception, no matter what. I suppose part of teaching control is suggesting references for a perception ("try to bring your arm farther back on the backswing"), but I think the learner is just exploring the ability to vary that perception as a means of controlling others. What a good teacher teaches is *how* to control—not *what* to control, no matter what.

And Dag says: "Influence is for real, and it is important. The world is not populated only by well-behaved, adult, PCT-academics, who object to being 'controlled' by others. To pretend that positive influence through teaching 'standards' or 'principles' is (1) impossible or (2) bad is a cop out. Parenting, management, teaching, leadership, and counseling are about that." I'm not saying that teaching "standards" is impossible. I'm saying that if people actually adopted fixed standards, they'd be dead in the water; they would not be able to control higher-level variables.

I can't help thinking that I am "well-behaved" because I have pretty good control of the perceptual variables that I need and want to control. I have to believe that *most* of those who misbehave are doing so not because they haven't learned about "right" reference levels for certain perceptions, but because they can't control much at all—let alone what you might suggest as the profitable things to control. Society has been trying to make people "well-behaved" by teaching them values, good "standards," etc. for *centuries*. But there are still plenty of misbehaving people, especially in places where people have the least ability to control their own perceptions (due to lack of education, money, skills, resources, etc., etc.). (I have noticed very little serious misbehavior in Beverly Hills; and I hear that Dag's town, Valencia, is a very safe place. Is this because the people in these people have learned the correct "standards"? I think it's because they have excellent control of what they need to control-and not such hot standards sometimes). I believe it is lack of *control* that you perceive as misbehavior, not lack of "good standards;" and I find it mean-spirited and coercive when people claim that the solution to "misbehavior" is getting people to learn better values (standards). How condescending; where is Charles Dickens when we need him? I think "teaching standards" is just that of tire religion again; it's certainly not HPCT.

As for influencing my own kids—of course I want to influence them. But what I really want is for them to be skilled controllers, able to deal with a world filled with unpredictable disturbances that do not allow

for inflexibility and simple solutions. I want them educated and loved (so that they can learn with poise). I don't know how to teach control; but I know it's not by teaching the "right" references. One thing that is involved is a respect for the fact that the kid is the only possible system that can know when its references are set properly; it's when there is minimal error at all levels of the hierarchy. My kids are (so far) splendid control systems; that's all I ask.

Dag says: "Character education is, I think, a very useful form of 'social control' that is vitally important, no matter where it comes from." And I say: forget character education. To the extent that you are in the position to do so, teach people how to control (and keep a good supply of degrees of freedom available for allowing that control—i.e., prevent overpopulation) and you will end up with a bunch of very nice characters.

It's all control.

Ed Ford: Concerning standards: Each of us has perceptions of how things ought to be, found at the systems concept level. In order to control for these perceptions, we each set for ourselves certain principles or standards that reflect those concepts and will become the basis upon which we make our decisions.

It seems to me that we set standards for ourselves and in cooperation with others (such as in a home, a community, or within an organization) all of the time. We also insist that others live by the community standards we set, or else we try to control those who refuse to voluntarily follow our standards. We teach our children cooperative standard-setting with others as the most sensible way to live in harmony. That is why we have communities filled with all kinds of standards, called laws. We as communities and families have certain values, and we set certain standards within the home or community that reflect those shared and agreed-upon values. We also teach our children how to set their own standards, and, just as important, we ask them to explore the down-the-road consequences of the standards they've set. This I've called teaching responsibility. I define responsibility as the willingness and ability of people to follow standards and rules and, ultimately, to set their own, without infringing on the rights of others.

I've done group therapy with juveniles quite extensively in various types of settings (mostly schools and correctional facilities). The juveniles are there because of their refusal to obey the standards of the community in which they live and also for having violated the rights of others. I think the purpose of group therapy is to teach those skills which lead to satisfying lives, including learning the skills for making and maintaining satisfying relationships, as well as the skills for becoming a self-sufficient, self-supporting, responsible human being.

The real issue for me is what is the most efficient and effective way to teach these skills at home or in various social settings. Since I am really only an influence, I have found that the best way for me to work with others is to first find out if the living control systems with whom I am dealing (1) want to deal with me, and (2) have reference signals having to do with improving their lives.

I have a close friend who has a 17-1/2-year-old son who lives at home, doesn't work, gets up at 6 p.m. and goes out until 5 a.m., is involved in stealing, etc. My friend is running a real conflict, where one reference signal is pulling toward throwing the (sometimes violent) kid out of the house, but there are two other reference signals: one that wants to avoid physical and possibly violent confrontation, and another signal demonstrating a great deal of love for this child. He also has several other reference signals, which include harmony with his wife (who is all for throwing the kid out of the house) and another that involves maintaining the standards for harmonious living within this home. That child is not willing to change his life style and is unwilling to deal with either his father or myself. It's very nice to control for what you want, but when it runs against the prevailing standards of where you live or work, then you have to live with the eventual consequences of your decisions.

The way I teach others how to use their control systems is through asking questions. I find little difficulty with the people I work with (including corrections) to get people to move up one or more levels. In fact, as soon as I get my clients to list their areas of importance to me (systems concepts level) and have them prioritize those areas in terms of importance, that's when I find therapy really gets going. As they begin to identify the areas of conflict (conflict between two reference signals at the highest order), evaluate what area they want to work on or where they would most likely succeed, and set the kind of standards for the area where if they were able to accomplish their goals it would them bring satisfaction, that's when they seem to find some relief. When they say they feel better, what there really saying is "I think I can now figure out a way for making things better in my life." Obviously, the real proof is when they begin to succeed.

With regard to standards within social organizations: Most, if not all, organizations and communities have set standards, and you have to be willing to live with those standards, or you leave (or don't join). There are many belief systems that say that if you want the perceived benefits of being a part of us, and you want identify yourself with us, then you've got to accept our beliefs and abide by the standards we've set that reflect those beliefs. And I think that's fair. I've joined several organizations whose standards were such that I left the organizations. Others I have remained with, the Control Systems Group being one.

Sometimes we set standards that just involve ourselves. I'm a very strict vegetarian, yet I've never tried to impose these standards on my wife or children. I have certain standards in other areas of my life. I figure the way I live my life is the best influence I can provide to others. One thing for sure, I've learned not to try to impose my beliefs and subsequent standards on others.

It's all perception, but we're responsible for our own.

Dag Forssell: Halfway up the HPCT perception ladder, a person might agree with Ed Ford that a husband and wife will have *different* concepts of "wife," but human nature being what it is, there will be an intuitive tendency to say: One to one against does not count. I *know* my *Boss Reality.* I know what a wife is (sort of), and I will continue to use that information. After all, mine is the only percept I have access to.

When we come to a miracle, the natural tendency, given a *long* history of perceiving in a certain way, is to say: It might look like a billion to one against to me, but I *know* my *Boss (Reality),* and nobody is going to take it away from me.

It goes against all intuition and apparent dependability of our basic senses to say "it's all perception," but it is the only conclusion I can defend, given my perceptual constructs. I think that when a person recognizes and acknowledges this, the person is more free to reorganize (without internal conflict), to respect his / her fellow humans (complete with individual perceptual constructs), and to promote a better social order with more degrees of freedom for all.

There is a *Boss Reality.* Our challenge is to perceive it as effectively and accurately as we can, while recognizing that this is *all* we *can* do. The *Boss Reality* does place constraints on our degrees of freedom. I perceive that HPCT provides an effective (and as accurate as can be had at present) perception of the *Boss Reality* of our minds.

The question of how to control well with maximum degrees of freedom for all will quickly demand attention to issues of influence, "social control" if you will, the principles or "standards" we live by, and the quality of information in all corners of our Hierarchical Perceptual Control Systems.

Rick says: "Reference settings depend on the goals of higher-level systems *and* on disturbances to the variables controlled by those systems-there is no one 'reasonable' setting for references at *any* level of the hierarchy. There can't be-and imagining that this is so can lead to internal conflict, interpersonal conflict, or self-destruction..." That there is no one "reasonable" setting for anything at any level might be quite valid. Is that a reason to never discuss any suggested settings at the principle level? I believe a lot of people abstain because of the uncertainties. Your reading of Joan of Arc differs from mine. I read her as

saying that she was willing to die for *her* references, not that they were *absolute*. Self-destructive? Sure! But in the long run, we all live and ultimately die for what we believe in-hopefully, of old age. What do we believe in? HPCT!

Rick also says: "Control systems that think that there is just one 'right' reference value for a perceptual variable are the control systems that really need to learn PCT!" The name is Dag Forssell. I am indeed trying to learn!

Bill says: "Influence is not control unless you (1) insist that your influence have a particular effect on the other person, and if it does not, (2) apply whatever means is necessary to make sure it does have that effect." I appreciate this help at sorting out definitions. I find it a difficult subject. But important to any practical use of PCT.

Violence and social control are bad. Influence might be OK, but we don't much like it either, because it smacks of control. The lines of demarkation get fuzzy. If a wife is unable to influence her husband, eventually she can exercise social control in the form of divorce. If an employer is unable to influence an employee to be productive in the line of business the company is in, then he will have to influence the employee to seek other employment. Some will call it (mistakenly?) social control or even violence. Personally, I have been laid off and have quit. It is a natural consequence of my own and my employers' requirements for degrees of freedom. But there surely is a lot of unnecessary waste, violence, and social control in business. Neither employers nor employees are effective in their control. You find conflict every place you look.

It seems to me that the absence of appropriate influence leads a person to fail to develop the good information content required for good, effective, satisfying control. I continue to be interested in influence as a constructive activity. It is difficult to deal with.

We must show how to apply HPCT for the satisfaction of all. Information offered must tie into what people already (think they) know. It must offer something of immediate interest, address some dissatisfaction or error signal people have, or it is of no interest.

Rick Marken: I have my references for "standards," just like everyone else. If asked, I would say I like people (including myself) with high levels for what I perceive as honesty, integrity, responsibility, and so on. It's difficult to talk about "standards" without having an idea of what constitute "good ones." So I suggest that we move this discussion from a discussion of standards (just one type of perceptual variable) to the model that supposedly informs our understanding of human nature. 1 might prefer particular system concepts, standards (principles), programs, etc.—i.e., I might have a collection of references which can, over time and variations, be perceived as a particular "ideology."

That's just me—my system that grew up over the last 46 years. I'm not interested in pushing my whole ideology, just one component of that ideology: a model of human nature called HPCT.

So, what I believe in (as far as this audience is concerned) is a spreadsheet! The three-level spreadsheet hierarchy described in one of the papers in my book, *Mind Readings*, captures what I believe is the basic functional organization of a human being. Some things are missing—like the reorganization system. But this model gives a good picture of my image of an organized (grown-up) purposeful adult. One nice thing about this model is that it is *all numbers. The* numbers that are perceptions are functions of other numbers—the functions define what is perceived. Numbers are nice, because people don't care that much about them. The perception numbers at level 2 of the model, for example, could be representations of the degree to which some standard (like "honesty") is being perceived (in the spreadsheet level two perceptions are actually functions of linear combinations of intensity perceptions). The spreadsheet has four control systems at three levels; the reference for the highest-level systems are fixed (they are numerical constants), but they could be changed randomly by a reorganizing system. The model acts to keep all of its perceptions matching all of its references. So the level 3 systems adjust the references to *all* level 2 systems (changing the reference *numbers) so* that the level 3 perceptions are maintained at the reference levels. The spreadsheet does this even when you change the environmental variables (also numbers) on which the controlled perceptions are based-that is, it controls a hierarchy of perceptions in the context of changing environmental disturbances and in the context of the changing control actions of all the individual control systems.

If you give names to the numbers at each level of the hierarchy, then things can get personal. For example, if you think of system 1, level 2 as controlling a perceptual "standard" called honesty (as one means of controlling the higher-order perceptions, which might be called "system concepts"), then you have to say that the system is varying its reference for honesty to control whatever perceptions are being controlled by the higher-order variable. This is why I say I don't think that there can be fixed references for *any* perception-it's not because I'm pushing moral relativism or personal autonomy or libertarianism. The only thing I am pushing is the PCT *model* (and I can envision it best and see it working best in the spreadsheet implementation, because I know what the numbers mean; I know this is not the easiest way for many people to visualize the model, but it does have that one nice feature: it doesn't hit any emotional buttons).

So I suggest that when we discuss these big philosophical issues, we try (to the extent we can) to relate them to what we actually know—

the HCPT model. HPCT is a real, working model, and many aspects of it have been tested and passed with flying colors. There are many aspects of the model that we don't understand (like how it could perceive something like "honesty"), and many things that will surely need to be added or changed as a result of research (Greg's suggestion that higher-order outputs might influence lower-level parameters besides references inputs, for example).

I think if we talk about functional organization more, and specific perceptual variables and their references less, we might get a better idea of what HPCT is about. The words (and the fact that people are themselves control systems with their own references for standards and whatever) can really get in the way. HPCT is HPCT—it's not liberalism, radicalism, libertarianism, judaism, mormonism, monotheism, etc., etc. It's a functional model that explains (purportedly) why people behave according to any of these principles. The model is a bunch of numbers that are functionally related to other numbers. It doesn't say what it is "best" for those numbers to represent.

If there is any "value system" implied by the HPCT model, it is just that the model should *work*—i.e., it should be able to keep *all* of its perceptual numbers equal to all of its reference numbers. Anything that prevents the model from doing that is something that should be "fixed."

When Dag says that there might be "right" levels for certain perceptual variables ("standards"), what I hear is the claim that "I can set one of those level 2 reference numbers to a *constant* in the spreadsheet hierarchy, and everything will work even better—the only thing that I have to do is find the *right* number." Well, I know that that is not true—quantitatively: it is not true of numbers in a control hierarchy. If you believe that those numbers are a representation of perceptual variables and that things like honesty are perceptual variables, then I leave the conclusion to you.

But I am open to any model-based (and research-confirmed) evidence that there are *right* constant values for variables in the HPCT model. I mean, HPCT is my ideology, but it is open to test (that is one *nice* thing about numbers).

Greg Williams: I find much appeal in the recent posts by both Dag Forssell and Rick on standards and PCT. It seems to me that Rick's viewpoint, with PCT ("all perception / all control / all numbers") in the foreground, addresses the issues in a general manner, while Dag addresses some particulars. I can see the validity of both in their special provinces—but I think everyone must beware of being overly provincial.

From an examination of the histories of the diverse ethical systems

which have flourished around the world at various times, ethical *contextualism* (rather than either relativism or absolutism) might be the best model. The nasty connotations of ethical relativism are apparent when the issue is framed as: In *this* society, you're trying to tell me that anything goes (makes sense, fits in, works)? Obviously ("obviously!") the way we upstanding citizens do it is what is best!!! The nasty connotations of ethical absolutism are apparent when the issue is framed as: Why don't those people in that *other* society do it the way *we* do? Obviously ("obviously!") our way works, and so it should work for them, too!!!

An ethical contextualism offers a middle road, recognizing that, within a particular context (sometimes quite broadly defined—i.e., we're all human), there are certain standards which *do* "work," but also recognizing that if the context is different, those standards might cease to "work." Most tribes, I have read, refer to themselves as The People, which emphasizes their distinctness from others who *aren't* The People. That insularity, rooted in ongoing personal confrontations with a particular context, makes great sense up to a point. Then the conquerors come along, of course, and try to impose a new ethics (no more infanticide, etc.) *and a new context.* If the new ethics precedes the new context (and probably even if it doesn't), there is a great likelihood of pain.

Personally, I would like to see more recognition that individuals' contexts are much more variable *within* our own society than many people like to admit, and so there are grounds for ethical pluralism (e.g., in attitudes toward abortion as influenced by economic status). Yet I understand that there is a perceived need to restrain such pluralism in hopes of keeping "us" (e.g., U.S.) "together" in the face of "challenges" (mainly "foreign competition," it seems, these days) from "outside."

So I can see the cases for local (sometimes *very* local—and possibly *very* ephemeral, too) "absolute" standards *and* for the contextuality of *all* of those standards, seen more globally.

It's all contextual.

Rick Marken: Dag Forssell says: "That there is no one 'reasonable' setting for anything at any level might be quite valid. Is that a reason to never discuss any suggested settings at the principle level?" The change in the height of a column of water depends on the volume, not the mass, of an object that is placed in the water. Is that a reason never to discuss ways to bring the water level to a particular height by suggesting settings for the mass of the object to be added? I think the answer to your question is another question: What do you consider to be a waste of time?

Ed Ford says: "Each of us has perceptions of how things ought to be,

found at the systems concept level." These are called references; they define what we ought to be perceiving. These exist at *all* levels in the model, not just at the systems concept level. We have references for how much pressure to feel on our fingers, and how much like a fist our hand configuration should be in, and how rapidly our hand configuration should be changing.

Ed also says: "It seems to me we set standards for ourselves and in cooperation with others (such as in a home, a community, or within an organization) all of the time." This is the crux, I think. We care about "standards" because they often determine lower-level actions that might influence the variables controlled by other people. I think Greg picked up on this in his suggestion that "ethical *contextualism* (rather than relativism or absolutism) might be the best model .... An ethical contextualism offers a middle road, recognizing that within a particular context (sometimes quite broadly defined—i.e., we're all human), there are certain standards which *do* 'work; but also recognizing that if the context is different, those standards might cease to 'work."' Yes; and the important context is other control systems. My spreadsheet model has to be expanded to two (or more) hierarchical systems simultaneously working in the same environment of numbers (degrees of freedom). I think you would find that these models would quickly run into conflict if their *higher-level* (level 3) systems were controlling for the same variables relative to different reference levels. There would always be less conflict at the lower levels because the references for those levels can be changed by the higher-level systems that see that there are lower-order errors.

Actually, I think I will do this modeling effort; but my intuition is that the only way to solve the problem of multiple interacting control systems, operating in the same environment, is to align the references for the highest-order systems that are controlling the same perceptual variables. I wonder if the solution would be found automatically (through reorganization), or whether there needs to be a system that actually perceives that there is conflict and looks for a cooperative solution. I think the former might work.

So I think it's possible that alignment of higher-order references might be a natural consequence of being reorganizable hierarchical control systems. Of course, the values at which these systems get aligned are not necessarily determined—just as long as they are aligned. I think this is why we see such remarkable differences in cultures. There are remarkable differences between cultures in terms of system concepts like marriage (polyandry, monogamy, polygamy, etc.), and they all work; apparently because everyone buys into that reference. Of course, once pressures lead individuals to shift references (our society seems tacitly moving from monogamy to serial monogamy—largely as a result of an

unpredictable disturbance; people are living longer), conflicts between control systems increase, as would be expected until the group is able to "realign."

It's highly unlikely that any society will align on a system concept that demands really "bad" standards like murder. There are standards that are self-correcting (the people who aligned on the system concept that demands murder would be quickly eliminated from the pool of control systems). Note, by the way, that most societies have aligned on system concepts that make it perfectly OK to murder the members of other societies. But that's getting into more substance than I think is appropriate. Back to models.

Greg says: "It's all contextual." OK, I'll buy it. How about another: It's all interacting control systems.

Bill Powers: Rick pointed out that "desirable standards" are not reference levels, but variables. It's easy to show that they are variables just by finding words to indicate other states than the states one automatically assumes for them (the states one likes best):

"courage": bravado, foolhardiness
"conviction": stubbornness, prejudice
"generosity": profligacy, gullibility
"kindness": bleedinghearted sentimentality
"helpfulness": nosy do-goodism
"honesty": bluntness, cruel candor
"honor": hubris, egotism, bushido
"justice": revenge, brutality, litigiousness
"tolerance": naivete, permissiveness
"sound use of time and talents": working for someone else
"freedom of choice": abortion as belated contraception
"good citizenship": supporting the war
"the right to be an individual": offending everyone
"the right of equal opportunity": the right to sleep under a bridge

The problem with lists like these is that they define only dimensions of perception (variables), but, by implication, they specify some particular state of the variables that is "best." The right level for one person is too much for a second and not enough for a third. The right level for today and this person is the wrong level for tomorrow and someone else.

Even the perceptions that go with the words are different for different people. When a manufacturer supports the "Right to Work" act, a labor union opposes it, because the words mean one thing to the manufacturer and another to the union. When an inhabitant of South Los Angeles

asks for the right of equal opportunity to work at rebuilding the wreckage, a white construction worker objects because it will deny him or her equal opportunity to make a buck doing the job at a higher wage. Freedom of choice is an empty promise for a person without the means of implementing any choices; for others, it's an excuse for maintaining segregation and shielding themselves from contamination by the rabble. A "sound" use of time and talent means, to some people, not wasting your time on fripperies like music and art and theorizing, but devoting your efforts to maximizing (somebody else's) profits. To a lot of people, honesty means that it's OK to cheat the IRS or a business rival, but not to cheat me.

The names of standards refer to things that are not words, but are shifty attitudes that vary with circumstances. All that makes sense of any kind of standard set to any momentary level is the system concept under which it is adopted. I thought that Ed Ford's recent discussion of standards hit a lot of nails on the head.

I also thought that Rick's statement hit a nail on the head: you can't set a reference signal to a constant value and expect the higher systems to go on working properly. They work by *varying* lower reference signals, not by picking one setting and sticking to it. This isn't "moral relativism"; it's simply recognition that the system concepts that organize and use principles are more important than any particular principle, or any particular state in which to maintain a given kind of principle. Moral rules followed blindly and implacably can generate the cruelest of all human aberrations.

The only reference signals (and perceptions) that can't be changed freely as required by higher levels are system concepts. And the only reason we can't vary our reference signals and perceptions at that level with complete freedom is that there seems to be no place to stand except another system concept-if there is a higher viewpoint, it's impossible to put into words or systematize. If there's free will, the only place it can work is at the top, because everything else is dependent and interconnected. And even at the top, we're free only to be human.

Rick Marken: A public reply to a personal note from Ed Ford: I know no one whose standards I admire more than yours. I think you and I have similar ideas about what constitutes an admirable individual. I think we run into a problem with these damn words. That's why I like models, I guess. They let us back away and just look and see how they work. I think you are able to do this with real people better than anyone 1 know.

Chuck Tucker: Rick, I just could not resist this: By what standards do you determine that you "like" Ed (or anyone, for that matter)?

I think this is a problem too: There is no "good" reason that anyone should like anyone else, but some of us do.

I think what we need is to submit these notions that we (or you) are putting in this model to a test. Devise an experiment that might be able to determine that a person is using a standard with regard to another within the confines of a particular act (this, by the way, was an assignment to my class; no one was able to do it even after reading HPCT all semester).

I think we (really I) must remember that this model (HPCT or PCT) is one which is developed out of engineering and seems to apply quite well to artificial systems that can be built, and to living control systems *up to level three.* There is some information from a variety of studies and other experiences of we who are using this model that it is useful for explaining or understanding or comprehending behaviors. Don't misunderstand me—I firmly believe that this model will work better than any one that I know of—but I realize that it still needs extensive testing. I have not done the work that is required, and I have not seen it done by anyone else, *but* I believe it can and will be done.

Don't you agree?

Rick Marken: Chuck Tucker says: 'Rick, I just could not resist this: By what standards do you determine that you like' Ed (or anyone, for that matter)?" I don't know. But the fact that we like and dislike anything suggests that control is going on. I think it is very difficult to verbally describe all of the perceptual variables that are involved in 'liking a person;' let alone the reference levels (standards) for those variables. If you mean what principle perceptions do I have relative to Ed that I feel are close to my currently prevailing references for those principles (as I sit here at the keyboard and try to describe them), then I think of things like "family"—I like the principles I perceive as exemplified in Ed's relationship to his family. I like the principles I perceive in Ed's interest in and understanding of PCT. Again, these are just words; you would get a better sense of what I'm talking about if you could have my perceptions and my references for those perceptions. Short of that, you could do an informal "test" to see what level of the "family" principle I like to perceive, e.g., by describing people who exemplify different levels of that principle. I admit, for example, that my "liking" for JFK went way down when I heard that he was regularly unfaithful to his wife. You would have to do a lot of testing to figure out what principles were violated for me-for example, my liking for JFK would go right back up if I found that this behavior was done with his wife's consent. My own impression is that what is violated (for me) by JFK's infidelity is a reference level for a particular perception of "respect for other people," not a reference level for "who

to sleep with when you're married." But there was some reference for a "standard" (can't we call it a principle as it was originally called? This use of "standard" really confuses me, because it sounds like a reference level) that was violated.

Chuck also says: "I think this is a problem too: There is no 'good' reason that anyone should like anyone else, but some of us do." I think the only reason we do anything is to keep all of our perceptions matching their references. Whether that is a "good" reason or not, I don't know.

And he says: "I think what we need is to submit these notions that we (or you) are putting in this model to a test." Agreed. But it is very difficult to test for control of these higher-order variables; we can barely describe them.

And: "Devise an experiment that might be able to determine that a person is using a standard with regard to another within the confines of a particular act (this, by the way, was the assignment to my class; no one was able to do it even after reading HPCT all semester)." This is very difficult—especially if by "standard" you mean "principle." But it's pretty easy for many other variables. Try getting really close to a stranger; talking really loud during a conversation; using a lot of profanity (if you can—some of these disturbances are hard to produce because they require the "disturber" to set his/her own references to unacceptable levels for his/her own hierarchy). It's really not hard to see variables being controlled-any time someone acts like something is *wrong*, there is a perception that is deviating from a reference—but it's not always easy to name the variable.

I've found (for now) that the discovery of controlled variables is like a Zen exercise; don't try to name stuff; get those words out of your head for a while. Try to just look at the world as variable perceptions; arrangements of objects, relationships between them, etc. Watch how people seem to like certain states of these variables, rather than others. Note that sometimes they seem content with things, and sometimes they protest and complain; the protesting and complaining and the "fixing" and the doing are all evidences that something is not as it should be for a person. You need sharp clinicians to figure out what those controlled perceptions might be.

One of the problems is that most of what people control is too obvious and too "trivial," so it goes unnoticed. People are not generally running around trying to control the "meaning of life." They are moving things from here to there (moving themselves from here to there); carrying out programs, categorizing (it's an "X"—no, it's a "Y"). If you know someone who makes music (well), you might see if they can imitate the "style" of some well-known artist; that's a pretty complex variable (I do a mean Bob Dylan). Control is all around—maybe the problem is that

it's too much around—we take it for granted. Bill Powers once said that feedback is like the air we breathe; I think this is true of control, too. Because it is everywhere, it is invisible, unless you know what to look for (like the answer that's "a blowin' in the wind").

Dag Forssell: Rick, You cannot derive any values at all from the HPCT model, especially when it is viewed as a mathematical spreadsheet. I am not claiming that a certain level of these variables or references are *right*. I have meant to offer the observation that perhaps a lot of people get along quite well in spite of holding religious systems concepts that are totally incompatible, because they tend to set references at the principle (what Ed calls standards) level *similarly* anyway. (I have used the word "reasonable," meaning "well thought out," but never in my mind have suggested *absolute* or *constant;* that is your interpretation and contribution—it does make for feisty argument.) Perhaps that shows that more "down-to-earth" systems concepts / understanding based on experience, instead of "intellectual / religious" constructs, .are what really influence the principles most people go by.

I do understand that there is not just one "right" reference value for a perceptual variable anywhere in the hierarchical structure. I do not understand your emphasis on *variable* to describe the list, as if to disqualify reference. As I understand it, precisely the same perception that we call the reference is what "behaves" to create the specified perception of what we call the variable. The words used to describe the reference and the variable perceptions are identical, since the perceptions are identical. You have to specify that you are referring to one or the other. Neither is fixed, since the reference is set at the moment as part of the entire, interacting hierarchy.

Personally, I believe it comes naturally to want to find some meaning in your own life. I think meaning can be found in secular systems concepts just as well as in religious systems concepts.

Rick says: "... I think I will do this modeling effort; but my intuition is that the only way to solve the problem of multiple interacting control systems, operating in the same environment, is to align the references for the highest-order systems that are controlling the same perceptual variables." Great! Maybe we will be able to illustrate more about how control systems disturb one another. You can get part of the way there with rubber bands, but only on one level, of course. I share your expectation about the requirement. This means that we have to talk until we have the same systems concepts, after all. It will not be enough to say that you subscribe to the same principles. This is what Greg observes, as applied to each tribe or subgroup in its context.

This entire exchange has caused me to reflect on my own assumptions and understandings. My ideas relating to character education go back

to 1980-83. I have not scrutinized these particular systems concepts in the light of PCT until now. I have already reorganized some, but I have not settled down yet. I find merit in Rick's observation that it's all control.

HPCT as a model has much to offer. My interests focus on how to teach and apply it. Since we live in a real world with finite degrees of freedom, and a Boss Reality to study, it becomes important to reflect individually on the specific perceptions you fill your own hierarchy with at all levels, so that you can control well. Numbers are not enough. As a parent, manager, teacher, or counselor, it is my challenge to assist those who want to be assisted to fill themselves with good information. Good information will include an understanding of PCT.

There is no such thing as character. There is only effective control. Internalizing the systems concept of yourself as an autonomous control system and adopting the same systems concept on behalf of others (a value judgement) might lead you to principles of similar appearance as those that have been labeled character. As I said, I have not settled down yet. Additionally, perhaps there is no such thing as violence, coercion, social control, influence, etc., which it is why it becomes difficult to distinguish one from the other. What there is is control by one system which creates disturbances for another control system. If two systems control the same variable, you have to look at the coupling of each to the variable, loose or tight, and the resources (or amplification or force) available to each. In arm wrestling, two control systems control the same variable with tight coupling. The control system with the most force minimizes its error signal. The other system gets a large error signal.

Bill says: "Influences should be thought of as disturbances. That is, you can perform an act that by itself would alter the other's perceptual world if it were the only influence." It makes sense to me to see influences as disturbances. Can you see information as disturbances, also? In one book on listening I read long ago, the author suggested that in active listening, you choose to anticipate what the speaker will say next, see what they do say, and compare the two. When you guessed right, you confirm with satisfaction. When the speaker says something else, you think about it intensely. Either way, you are alert and hear well. Of course, you might control so you hear what you want to hear instead. You put the words into your own context.

With this in mind, I can think of reading a post as a lot of small and some not-so-small disturbances. I have to recognize that I am disturbing just the same when I post. Some of the information flies by with minimal disturbance, some is unsettling.

As a parent, I create disturbances for my child in many ways, which the child has to deal with. Thus the child fills with experiences / per-

ceptions / understanding throughout the hierarchical structure. If I plan the disturbances well, the child learns to control well. I could say that I deliberately create error signals in my child. This thinking agrees with Chuck Tucker's post.

Bill also says: "Parents influence their children by (for example) advice, commands, example, demonstration, and story-telling." I am now beginning to think of all of these forms of influence as made up of disturbances. Does that make sense?

I am controlling and perceiving as best I can.

Mary Powers: Rick and Chuck: Why do we like people, indeed? The real issue to me is why we dislike people. This winter I read Eduardo Galeano's *Memory of Fire*—a three-volume history of the Americas, mainly South and Central (a must read in this half-millenium year of 1992). Pretty brutal. The point here is that it seems "natural" for humans to dislike, fear, and consider subhuman people who are strangers, or different. Often people will like an individual they "get to know" (share reference levels with) and yet continue to dislike other people of the category (Black, Jewish, whatever). We do need to like and be liked, but what about this other reference level?

Ed Ford: The other night I had my meeting of local control theorists who are trying to implement these ideas in their jobs. One of us, Alan Wright, was recently appointed superintendent of schools for the Arizona Department of Juvenile Corrections. He has been working night and day at the two major lockup institutions where the toughest juveniles in the state are sent, trying to implement a new program using PCT as the basis. In the past, diagnostic teams have decided what juveniles would be doing and establishing their plans. Juveniles were staffed monthly and told what they were doing wrong. Juveniles never sensed any control as to when they'd get out. It was always kind of vague. All they learned from the staff was how to be criticized. Now, things have changed, thanks to Alan. First, there are those who know they are getting out (like at age 18) or are going to be transferred to an adult prison. These could care less and continually cause trouble. They have been separated from the rest of the population and are in highly restricted and supervised units. But for the others, things have changed.

Alan and I have been working on the practical applications of PCT to this kind of setting for several years. At Adobe Mountain (the toughest), the juveniles had taken over the place. Alan really tightened the place down. Then each juvenile was asked as he entered the institution what he wanted. The universal answer was to get out. Alan then would ask them what they had to do to get out. He'd explain to those who didn't

know. To the acting-out juveniles, he'd say, "Is what you're doing getting you what you want, which is to get out?"

Alan has the juveniles working in small teams of 36 with three teachers, each teacher directly responsible for 12 juveniles. The job of each teacher is to help the juveniles work toward getting out, which translates into getting certain tasks done in school and following the standards and rules in the classroom. The old idea of being in so long (like six months) and then being released has been replaced by the requirement to get the signoff (approval) of each of the juvenile's direct supervisors in education at the school, and the line officer and case manager where he lives, and the person in charge of activities (work or recreation). Everyone has to sign off, saying that the juvenile is following the rules and working to his best ability and accomplishing his tasks. Any time the juveniles act out and are sent to lockup or to an intensive treatment unit, that time doesn't count against their credit for getting out of the facility. Time is no longer important-only achieving tasks that reflect increased responsibility will get them out of there. The juvenile is given total control over when he gets out of the facility. He has to accomplish certain goals, but he alone has control over how quickly he can get released. Obviously, the more violent the offender's crime, the more responsibility has to be shown over a greater period of time.

It's amazing how the place has settled down. And it's amazing how quickly acting-out juveniles settle down, once they learn they have control over when they get out. To you freedom-loving control systems on the net, this might not sound like PCT, but within the reality of the juvenile correctional system, asking the juveniles what they want and giving them control as to how long they are in a treatment center they don't like has given them a sense of control over their destiny they've never had in the past. There seems to be less violent and more thoughtful reorganization going on. When they do act out, the supervisors just ask, "Is what you're doing getting you out of here?" or "Do you still want to work at getting out of here?"

Dag Forssell: Ed, what a marvelous post! Most encouraging. You show clearly the power of starting with a focus on what people want, instead of a focus on how people behave. You apply disturbances to encourage reorganization over time. You give the delinquents a measure of control they have been denied before.

While your situation is rather extreme, it is not different in kind from many other interactions between parents and their children, business owners and their employees, counselors and their patients.

Again, your results are exciting! Your years of preparation are paying off in a significant way. Congratulations!

Rick Marken: It looks like my distinguished peer, Danny Quayle, has made standards more appropriate than ever. Now, it seems, the official government position is that those nasty social problems would be solved if everyone would just adopt the right values (standards)—and guess who's standards those are? The Trobriand Islanders' values? The Nepalese values? The Danish values (my personal favorite)? Nope—Republican values. Thanks for clearing that up, Dan. It makes me proud to be a member of the '60s generation. If only he could claim that it was the result of smoking too much dope.

I don't like the word "standard"; it can be a synonym for "reference;" so it is very confusing to me when people talk about the *importance* of "standards." It sounds wrong when I think of standards as references, because *all* reference signals are important in the model. And it sounds wrong, for the same reason, when I think of standards as principles. It is no more important to control principles than it is to control intensities.

The PCT model says that we are controlling many levels of perceptual experience simultaneously. Lower-level perceptions are controlled in order to control higher-order perceptions. The higher-level perceptions are in no sense more or less important than lower-level perceptions; all perceptions must be brought to their reference levels in order for there to be control at all. So it is just as important to be able to control the position of your torso as it is to be able to control your position in a perceived relationship as it is to control the principle that is satisfied by being in that relationship, etc.

Principles often have to do with other people (they involve setting references for relationships between you and other people, for example). I think these perceptions seem special only because most of our control problems involve attempts to control variables that involve other people (as one would expect, since people, being control systems, cannot be controlled, and so there will often be large, chronic errors in these systems). It will be very hard to control relationships, programs, principles, etc. that involve other people. Since control is generally poor for variables involving other people, our attention (consciousness) will tend to be examining the control systems at this level (it is a kind of postulate of PCT that consciousness tends to move to the level where reorganization is required-no tests of this that I know of so far; hence, I am talking through my hat).

I am hypothesizing that consciousness (attention) tends to be directed toward control systems involved in the control of variables which involve other people (due to the chronic error that tends to exist in these systems). Better yet, I think we attend to systems involved in the control of variables which involve *at least* the *relationship* between people—most importantly, relationships between *ourselves* and other people. So my

hypothesis is that we attend mostly to systems controlling perceptual variables at the relationship level (level 6 and up). We rarely attend to our control of intensities, sensations, configurations, transitions, events, etc. We do attend to relationships (with the boyfriend/girlfriend), programs (soap opera stories), categories ("he was a ..."), principles ("he done her wrong"), and system concepts ("that was no way for a Christian to behave").

I think it does something of a disservice to the PCT model to try to emphasize the importance of one type of perception relative to another. They are *all* important.

If the feeling is that the higher-level systems are more important because they determine the goals of the lower-level perceptions, then this feeling is incorrect (in terms of the model, anyway). The particular reference level that is selected for a lower-level perception depends on the goals of the higher-level perception *and* on prevailing disturbances which are independent of the goals of the system. So, setting my reference for a principle, like "get control of the renter," will result in very different chess moves (relationships) on different occasions; some of those moves might not actually be "good" in terms of other goals (like winning the game) if I just blindly follow the principle.

But you all know that. We just tend to forget it when we are dealing with really "important" principles (the kind that we have been calling standards): principles like "be *kind* to your neighbor" (even when your neighbor is a Nazi who is trying to *kill* you?). The desire to find the "right" references for our perceptions of principles, etc. (i.e., interpersonal perceptions) is strong; and I think it's because consciousness *does* tend to focus on these levels. Consciousness is involved in learning, and the goal of learning is to try to find the "right" reference settings for perceptions involved in what you are trying to learn to do (to control). If we had more difficulty with the lower rather than the higher levels of perceptual control (so that consciousness was always hanging around those levels), we would probably spend all of our time trying to figure out the right configurations, sensations, transitions, and intensities to experience. Sometimes we do try to figure out the "right" settings for these variables—like when we are learning a sport or a musical instrument. Of course, even in this case there are no right settings; just the right variables to vary (by changing references) in order to control the higher-level variable.

I suggest that unless an individual is conflicted at the principle level, there is no reason to try to direct their consciousness to that level in particular (indeed, if they are conflicted at the principle level then you should try to get them—their consciousness—up to the system concept level). I would say that, as a control theorist, I would try to get a person's consciousness *away* from their principle level if there is *no* conflict

there. Putting consciousness where it does not belong can be quite a problem (at least in theory), because it can start a reorganization that is not necessary. If you doubt this, just try moving your consciousness to the perceptual levels that are ordinarily unconsciously controlled in a well-learned skill; I tried this after I had learned to play a two-part invention by heart. I tried to become conscious of what my fingers were doing (the sequence level and some transition and configuration stuff too). The two-part invention turned quickly into an n-part cacophony,

I think Zen people know the potential problems of consciousness. My suggestion to people who are doing therapy (on themselves or on others) is to lay off the levels that are not conflicted. And don't assume that a level is conflicted just because it seems like it is important; I bet very few people have any real problems at the principle or system concept levels. I bet most people just can't control relationships, programs, sequences, stuff like that. I would not *assume* that the problem is always principles (it might be intensities—maybe the person has a boil, not an "attitude").

Another motto: if it works, don't be conscious of it while it's working.

Bruce Nevin: I guess Rick means that one should lay off the levels that don't provide a higher vantage point on levels that are conflicted.

It seems appropriate to attend to principles (standards) if people are conflicted at the program, sequence, or category level, such that taking a point of view through principle perceptions discloses the terms of the conflict. However, I think there are reasons for attending to perceptions at or below the level of conflict.

I think a common (band-aid) resolution of conflict is to ignore lower-level perceptions that cause error at the level of conflict. One way to ignore a perception might be to substitute a copy of the reference signal by the imagination loop. Another way seems to have the effect of making areas of the body blank, dark, numb, foggy, armored—people use different metaphors. The character of the perceptions that are being blanked out might provide clues about the error being ignored, and thence clues about the conflict being band-aid-resolved.

In vipassana practice, after an initial period of attending only to perceptions of the movement of the breath at the nostrils to develop the ability to focus and maintain attention—the first 3 days of a l0-lay course, the first month of a three-month course, etc.—one begins to move attention systematically through the body, from one end to the other, area by area. It is a very common experience for a given area to seem "dark" or devoid of sensory signals, sometimes for extended periods, yet subsequently a great deal seems to be going on there. You're just sitting still, breathing, and moving your attention from

place to place, so there's no evident physical stimulation. In the interim, however, perhaps some emotion-laden imagery or memory has come up to distract you from attending to physical perceptions in the body. Like starlings, if you don't feed them, they go away. Attending to physical perceptions in this way is a way of not feeding them. Their going away unfed seems to be associated with the "waking up" of areas of the body that had been blanked out. Ignoring perceptions seems to have the cost of turning off sensory inputs. People who do body work (massage, polarity, etc.) are familiar with this.

Some forms of therapy dwell on the content of the emotion-laden imagery and memories. Perhaps this can be useful. I suspect it is useful only when people get in touch with their feelings, not in the sense of their emotional reactiveness, but rather in the sense of awareness of physical perceptions in the body.

Rick Marken: Bruce says: "I guess Rick means that one should lay off the levels that don't provide a higher vantage point on levels that are conflicted." Yes. I also mean that, if there is *no* conflict, don't try to become conscious of the non-conflicted systems. It's OK to go up a level from a non-conflict. It's like the piano example—it's OK to be conscious of the fact that I'm playing a two-part invention; it's just a bad idea to focus on the systems that are successfully producing the perceptions that are accomplishing this higher-level goal.

Bruce says: "It seems appropriate to attend to principles (standards) if people are conflicted at the program, sequence, or category level, such that taking a point of view through principle perceptions discloses the terms of the conflict." Absolutely!! And it is OK to go up a level even when there is no conflict; consciousness is just a problem when it is focused on the systems that are currently successfully achieving a higher-level goal; like when you think about *how you* manage to keep the car on the road *while* you are driving (it's perfectly OK, in terms of control ability, to think about how you drive when you are not currently controlling the car).

Assuming that the HPCT model is right and that we really do control perceptions of principles in order to control system concepts, then I am suggesting that, if you direct someone's consciousness to the principles that they are controlling while they are successfully controlling a system concept (like being a Christian or a Dodger fan) *while* they are controlling that system concept, then their control of that system concept will become less skillful. That's OK if there is a conflict at the principle level that prevents control of the system concept; but it's not such a hot idea otherwise (though I think it can be fun; especially if you don't care for the system concept a person is controlling). I think this is what goes on in skillful political debate; get your opponent to look at the principles

that they are controlling; suddenly, their ability to defend their system concept deteriorates; not because they see anything wrong with the principle, but because they just *see* it. (This could be another nefarious application of PCT; if you get really good at directing a person's consciousness to certain levels, you could screw up their performance on some task. For example, when you are about to play a game of tennis with your buddy, you might ask, "Say, are you still turning your wrist on the backswing?" Encourage them to think about this during the game. If they do, you are a sure winner.)

David Goldstein: The only problem I have with your therapy suggestion, Rick, is that it is not always easy or necessary or a good idea to be thinking in terms of levels when you are working with a person.

One of the ways you know you are confronting a conflict is when the person is not able to go up a level. The Method of Levels is taking you no place. As Bill Powers has suggested to me, when doing the Method of Levels, don't be so concerned with the levels outlined in the formal theory. Be sensitive to the background perceptions based on what the person is saying and the person's own reactions to what is being said.

A related point to what is being said has to do with a difference I've noticed between Ed Ford and myself in applying HPCT. Ed starts at the systems level and works downward. I start at a lower level and work upward. One advantage of the bottom-to-top strategy is that it avoids what Rick is talking about, namely, directing a person's awareness to levels which "are not broken."

Rick Marken: David says: "Me only problem I have with your therapy suggestion, Rick, is that it is not always easy or necessary or a good idea to be thinking in terms of levels when you are working with a person." *I agree!!* I only used specific PCT-level words because there was talk about the importance of "standards;" where "standards" were alleged to be principles (in HPCT terms). In real life, I would not even try for a second to relate a person's conflicts to the proposed PCT levels. All I suggest is that conflicts can occur at any perceptual level (in theory and in practice), so there is no reason to single out standards (principles) as an important place to look. In fact, the more I think about it, the more convinced I become that real conflicts have to do with pretty low-level percepts, whatever you want to call them, and that the resolution to most conflicts just involves seeing that things can be done in sequence, or that X does not need to be categorized as a Y, or whatever. I think it is rarely necessary to change principles or system concepts (or any high-level perceptual references) to solve most personal problems. I think this is consistent with the fact that people who hold transparently idiotic system concepts (from my perspective) can still get along just great

in the world. One exquisite example of this is the fellow who wrote my two-part inventions; J. S. Bach lived a wonderful life and produced the greatest sequences and configurations of sound ever produced—and he did it all for the God of Martin Luther. Silly system concept; great, non-conflicted control system.

I think that when we look at social behavior, we see all kinds of interesting things happening, but it is very difficult to see the possibly very simple sensory variables that are being controlled. PCT is an attempt to help us see beyond our interpretations of behavior—to what behavior is really about: control of perception. And this requires a special kind of looking (based on hypotheses about what variables might be controlled) and testing (to see if disturbances to the variable are resisted). We might be reading a lot into human behavior that is not relevant to what a person is controlling—for example, we say a person has "bad manners" or "poor standards" when they eat with their mouth open—when, in fact, they might just be controlling the amount of pain they feel because they have a toothache.

It is hard to get past our inclination to see behavior as "output." We assume that what we see is what the person is "doing." PCT suggests that we must by to get over that inclination (if we want to understand behavior) and take seriously the proposition that what we are seeing (when we see people "behave") are the means by which people are keeping their *own* perceptions matching their own references for those perceptions. We, as observers, *cannot* see what another person is perceiving or trying to perceive. We can only try to get an idea of what a person might be trying to perceive by doing the Test for the Controlled Variable.

What seems to an observer as control of a complex principle (at the "wrong" level with respect to the observer) might, in fact, be nothing more than efforts to get from point A to point B in the context of variable disturbances.

I think there has been some confusion about what control theory says about control, and what it says about the processes that might influence control—i.e., consciousness. This confusion becomes particularly acute in the discussion of standards (principles) where there is talk about "setting appropriate standards" and such. When we talk like this, who do we imagine to be "setting the appropriate standards"? The hierarchical control model says it is the "higher-order systems." The references for principles are automatically set by the systems controlling systems concepts. The point is that all this varying of lower-level references to control higher-level perceptions is carried out smoothly and automatically by the control hierarchy. I hate to point this out again, but this process is nicely illustrated by my hierarchical spreadsheet and (in a less abstract manner) by Bill's "Little Man." So

ordinarily, there is no external "agent" (other than the control hierarchy itself) that sets references—and varies them—and this varying happens automatically. This means that principles are varied *automatically* to control systems concepts; if the systems concept control systems need to vary the honesty principle reference to preserve the perception of the system concept, they *do* it. That's *you* doing it, but there is no choice going on-no conscious decision to be a little more or less honest in this particular situation. It just happens (just as your muscles tense automatically to control the position of your limb).

When we talk about a person "setting appropriate standards," I think we are talking about a phenomenon that is external to the PCT hierarchy. Subjectively, when I talk to myself and say, "maybe I should try X," it is my consciousness that is doing this. Consciousness is like something that hovers over the hierarchy and tinkers with it occasionally; at least, consciousness is what *can* tinker with the hierarchy.

I think we know a hell of a lot less about how consciousness works (in terms of phenomena and models) then we know about how hierarchical control works. But I do think that consciousness (the feeling of having to choose: "should I do X or Y?") only comes up when there is some degree of internal conflict or lack of "output functions" that can be used to control the required perceptions. When you are in control, you are rarely conscious of it, unless you make some effort to notice how well your hierarchy is working. When there is a failure of control (due to conflict, lack of skill, or insuperable disturbance), then consciousness is there. As I said in an earlier post, moving consciousness to systems that don't need attending to can create more problems than it might solve.

Ed Ford: I see counseling as similar to creative writing. When writing, I watch ideas pop out of my mind, as if I had little to do with creating them. I just think about the area where I'm curious or trying to work out a thought, and out something comes. It just pops up, and there it is. The bottom line is that I take advantage of my reorganization system and let it work for me, like creative people do.

Counseling involves using the reorganization system, the same creative process. I don't start at systems concepts and work down any more than I start at a lower level and work up. I begin my session by talking with my clients (what else is there to do?) about what they want, where they see their problems, a little bit about their lives. I have in mind the major areas of importance in PCT that are applicable, such as priorities, values and beliefs, standards, decisions, various areas of perception, our actions, wants and goals, and other stuff. Then I watch myself take certain directions, primarily areas in the clients' lives where both harmony and conflicts exist.

I tend to just watch where I go, letting ideas come out of my mind, not constricting my mind but letting it creatively seek various paths to take. When I occasionally find myself uncomfortable with where I am or what I'm saying, then another idea pops into my mind, and if it makes sense and is compatible with what I want, I go in that direction. That isn't to say that I don't have an overall structure in the way in which I work, or that I don't think about what I'm saying. I'm thinking all the time, but it's within the creative process. PCT has given me a delightful structure, and I've added my own way of understanding and creative process within the boundaries of PCT.

I basically look for where there might be two incompatible goals, or for goals clients have established but over which they have little or no control accomplishing. I also have them look at how they've structured their worlds, and I get them to evaluate the structure they've created.

Typical areas of conflict are a job demanding enormous time, a spouse and / or children needing time, extended members of a family such as sick or lonely parents, physical activities, or intellectual activities. There are all kinds of areas with interrelated and sometimes highly conflicting standards, decisions to be made, and various systems which have been prioritized. It is impossible for an outsider to know all the various areas of importance, their strengths and priorities at any one time, the varying standards, and how they are all interconnected within the total network of a person with whom you are dealing. That's why I think it's best to teach a person how to work out their own internal conflicts—only they know what is really going on. All I know is my own created perceptions of what I think is going on.

I think a big mistake can be made if a person looks at PCT in terms of an individual area of concern and tries to analyze an area in isolation from other areas. Again, there's so much going on. I can't think of a single area of importance to me that isn't tied into lots of other areas of greater and / or lesser importance. Hester, my children, my various jobs, my health, my faith, my friends, CSGnet, things around the house, all kinds of other things as well. These are all very interrelated areas, all with various priorities, depending on the time constraints and other areas of importance. To look for the single or major reason or cause for what people do within their network of reference levels is rather misleading. There seems to me to be too much interrelatedness within our structure of our values and beliefs, how we've prioritized them at any one time, and all the various standards we've set. Added to this is how all of the above can be conflicting with various disturbances when we are attempting to control in various areas.

The most important thing I've learned from control theory is that I'll never understand another living control system, and they'll never understand me. To quote Clint Eastwood (one of my very favorite actors):

"A man has got to know his limitations!" When living control systems come to me seeking help with various conflicts they're having, I see my goal as a teacher. My job is not to figure out why they do what they do. Rather, it is to help them build confidence in their ability to deal with their internal worlds by teaching them effective and efficient ways of resolving their conflicts and establishing harmony within their worlds. Control theory has given me more help in this area than anything else I've learned.

Rick, I think that directing a person's awareness to levels (or areas) which aren't "broken" can be very productive. Obviously, if people are doing well in one or more areas, but their belief-in-self systems aren't, then having them reflect on what they're doing well can be most helpful in rebuilding confidence. It is best to build from strength, not weakness. Also, sometimes it is best to build more strength in areas of success before attending to weaker areas. Again, as I was saying above, you just have to fuss around and help the client determine which is the best way to go. It isn't best to set hard and fast rules where you have so much going on.

David Goldstein: Ed, your principle-level generalizations for therapy are, based on your post: be creative and spontaneous. Be a teacher, teach them about HPCT. Be sensitive to signs of conflict and harmony and focus on these areas: Encourage people to believe that they can solve their problems.

At a more specific level, you say: "To look for the single or major reason or cause for what people do within their network of reference levels is rather misleading." But if HPCT has anything unique to say to therapists, it is: identify controlled variables by means of the Method of Levels and the Test for the Controlled Variable. In a clinical situation, this is much harder than in an experimental situation. If we give up doing this, I am not sure about how HPCT therapy is really any different from other therapies out there.

I know that when you ask people, "What do you want?" in the exploration phase of your counseling, and when you ask people, "is it working?" in your evaluation phase, you are moving in the direction of finding controlled variables. Maybe I simply go further in this direction through the explicit use of the Method of Levels. Asking people questions like you do certainly disturbs them and invites awareness to what is going on inside them.

Ed Ford: David says: "But if HPCT has anything unique to say to therapists, it is: identify controlled variables by means of the Method of Levels and the Test for the Controlled Variable." I don't really think PCT actually says anything in particular. The greater the understanding

one has of how the whole system works, the more creative a therapist can be in coming up with all kinds of ways to teach people how to deal with themselves. Certainly the ideas in PCT provide the creative mind various ways to more efficiently help others produce harmony within their own worlds. One of the keys to helping others is, as you suggest above, the whole concept of controlled variables, and how they can be used within the counseling session. However, I believe there are many intriguing ideas flowing from PCT that therapists can use, the idea of controlled variables being one of the more important.

Rick Marken: Ed Ford says: "... I think that directing a person's awareness to levels (or areas) which aren't 'broken' can be very productive. Obviously, if people are doing well in one or more areas, but their belief-in-self systems aren't, then having them reflect on what they're doing well can be most helpful in rebuilding confidence. It is best to build from strength, not weakness." I guess I didn't make myself clear. Based on subjective experience (not the PCT model), it seems to me that skill breaks down somewhat when you direct your attention (consciousness) to the means being used to produce a particular result *while you are doing it*. This is easy to demonstrate; while you are typing, think about how you are doing it; how you are moving your fingers, how you are adjusting and coordinating movements of the fingers, etc. You start making mistakes (more of them, anyway) when your awareness moves to these levels of control; control seems to work better when it occurs unconsciously—zen control. But there is no problem when you imagine typing and become conscious, in *imagination*, of how you do things. In fact, certain kinds of conscious imagining are reputed to improve control when you get down to actually controlling. I remember Dwight Stone imagining, over and over again, the details of a high jump event just before executing it. I guess his hope was that once he'd imagined it enough he could just go and do it (control it) unconsciously. The trick is to be able to change easily from conscious imagining to unconscious doing. Sometimes it works; sometimes it doesn't. Whether imagining itself can actually make things better, I don't know. Maybe that's why we dream—but that is usually unconscious (I think).

I have a feeling that consciously focusing on what one does right (in imagination mode, of course) might make one feel better but does not necessarily help a person in other areas. For example, I can't see how focusing consciousness on, say, one's ability to throw a football can help with one's ability to sell cars. I agree that it might help a person control self-confidence a bit ("yeah, you cant sell a car to your mother, but you cam throw the football pretty well"). But that's just making things better in imagination mode anyway. When the fellow gets back to the car lot, his confidence goes right back to hell. I think it's better to just get down

to the business of helping a person "move up a level" so he / she can see that he / she is creating his / her own problems. Of course, it might help him / her spend the 50 minutes in a session if he / she feels good about you and himself / herself.

Ed also says, in describing a PCT-inspired program for juvenile offenders: "Me juvenile is given total control over when he gets out of the facility. He has to accomplish certain goals, but he alone has control over how quickly he can get released." Well, it's not total control; a fellow (I presume they are all guys) can't get out one second after he gets in—or two, etc. They can control when they get out, but there is a lower (and, I bet, upper) bound to how long they can stay in, no matter how they act.

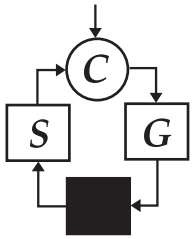
He also says: "To you freedom-loving control systems on the net, this might not sound like PCT..." I presume that's me. Actually, I only like freedom for people who do not plan to hurt me, my family, or anyone else I like (i.e., everybody). The program sounds just like PCT to me — the juveniles are controlling for getting out; you are controlling for the behavior of the kids, trying to make it look "under control." A program cannot be PCT or not; PCT is just a model of behavior. The program you describe is neither good nor bad—but given that you like it, it is apparently working for you. The kids seem to function in it just fine, too.

I imagine that the delinquents in this facility have set references for and achieved some results that have hurt other people. I am against people hurting other people, and when people do hurt others intentionally (and PCT tells us how to find out if they are doing this intentionally), then I am for preventing that result by any means possible. I am particularly in favor of this kind of intervention if people are doing it because they have become organized in such a way that this kind of hurting is part of the way they are controlling other variables.

So, if these juveniles are organized so that violence to others is just part of their organization, then I don't care what you do to them; just keep them out of my society. If, however, the behavior that got these kids into the facility is the result of reorganizations (because the kids have not been able to get control of their intrinsic variables) or just irrelevant (unintended) side-effects of control efforts that could be eliminated by education or counseling, then I think there might be other ways of dealing with the situation.

One point that might be worth noting: PCT should at least make one sensitive to the possibility that one's efforts to *help* another control system are really an attempt to perceive that system's behavior to be "as we like it." After all, *we* are control systems too, no?

To be continued



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