How I applied PCT to get results

By James Soldani

Effective Personnel Management: An application of Perceptual Control Theory (1989)
How I applied PCT to get results (2010)
These two articles complement each other.

I had an opportunity to experiment using Perceptual Control Theory (PCT) as a senior manager at Intel for 14 months in 1980 and 1981. From time to time, people have asked me how I was able to get such superior results so quickly and for such an extended period of time. Looking back, I see that my various attempts to answer that question in writing and in conversations have been fragmentary, and have not captured the total process I was able to create during that marvelous year.

I was also a very serious student of Bill Powers' Perceptual Control Theory. The more I learned the more I was remolding my approach to parenting as well as management It is a manager's lot to be under enormous pressure to deliver results every month, so I had little time to reflect on how I might structure organizational experiments with PCT or formally document the results, So my experiment at Intel was done on the fly amidst all the other daily pressures and distractions, yet done with very deliberate and focused intent based on PCT principles. I applied new methods and techniques with an almost obsessive focus for a period of about 14 months.

I never deliberately set out to create an organizational process, but as I led the team and moved from solving one set of problems to another, five elements of a process did emerge:

1. Intel's organizational culture facilitated the use of PCT-based methods
2. I worked with the various groups to set organizational reference conditions.
3. I worked with the various individuals involved to set individual reference conditions that supported the organizational ones.
4. I helped establish feedback mechanisms in groups and in individuals so they could control.
5. I provided personal PCT-based coaching to resolve conflicts in that control.

I will explain these elements in the following sections. This explanation assumes at least a basic familiarity with PCT, whose terms and concepts I am not going to try to explain here. The reader should also know that as I learned more about PCT I incorporated it into my own management style and experience. I have no way to separate the two in the way I speak about this experience. In other words there is no way to objectively measure how much of what was accomplished might have been done by me without PCT and how much only because of PCT. I can only attest that without PCT I would never have had the awareness, insight, or skills to deal with all these organizational dynamics as effectively as I did.

1. Intel's Culture: Risk taking, Responsibility, Results-oriented

From its inception, because of the insight and focus of Andy Grove, Intel has placed a high priority on creating an operating philosophy and culture that both demanded and enabled excellence. There were many facets to this which we need not go into here. Three elements of Intel's well documented culture were very important to my experience. These particular cultural elements were ingrained in the very fabric of the managers in the company because of Intel's extensive corporate training program.

The cultural element of **Risk Taking** provided me the freedom to take the risk of experimenting with new methods based on PCT. Had this not been so, it is highly unlikely that I would have tried to apply PCT, and much less chance to succeed with it in the time that I had. The cultural element of **Responsibility** further enabled me to succeed with new PCT-based techniques. Responsibility meant no excuses. A reason and an excuse were two presentations of the same information set. When employees used the information to analyze a problem and figure out a corrective solu-

tion to overcome a problem it was a reason. When that same information was used not to overcome a problem but rather to justify non-performance, it was deemed an excuse. In the Intel culture, excuses were never acceptable.

This was a very demanding value, and although both managers and employees understood it, only some were able to live up to it in practice day to day. PCT skills applied at both the group and individual level were critical to developing the confidence and internal strength (read super healthy operating control systems) in the people. Because this cultural principle was so well known in such a wide portion of the Intel population, I did not have to spend inordinate amounts of time trying to get people to adopt it. Rather I spent my time teaching them the skills to live up to it.

Lastly, the term **Results Oriented** meant that nothing cosmetic and superficial mattered. Only results mattered. Organizational goals or strategies were always defined in terms of results, and those results had to be achieved. Employees at all levels knew that half truths and partially achieved objectives would not be rewarded. This principle significantly reduced the politicking, game playing, superficiality, and spinsmanship in performance assessments at group, department, managerial, or individual employee levels. It also significantly reduced the blame game inside or between departments. If results were not achieved, everyone who might have contributed was in the same boat, no matter who was to blame. People at all levels were used to hearing the unvarnished truth about performance. Receiving evaluations, even criticism, while never comfortable, was expected and accepted. This enabled me to have easy access not only to my direct reports but to all the people involved. I was able to approach them with critical evaluations. But the way I provided those evaluations changed radically because of my understanding of PCT. Using the skills which I had developed, my influence over people became extraordinary.

My understanding of PCT has grown deeper during the years that have followed. As I reflect on this experience, I now realize that these cultural elements were systems concepts, a very high order of perceptual control in the PCT hierarchy. Because Intel spent so much time and money training managers and encouraging them to internalize these systems concepts as reference conditions in their own perceptual hierarchy, it made my introduction of new ways of interacting with others and teaching them new ways of interacting with each other much easier.

2. Setting group reference conditions for organizational goals

Achieving even the simplest goal often requires very complex interactions between different departments, and between groups of people within these departments. For example, senior executives might say, "Our company has a bad reputation with customers for not delivering orders on time. We need to improve this. We need an organizational goal for on-time performance." Thus they spell out the goal to their staffs of senior managers and expect that they will 'make it so'. At Intel, our manufacturing group's performance to schedule in any given month was terrible. Management wanted this improved to at least 90% on-time delivery to the customer.

When trying to implement new things individuals and groups must be brought to focus. Focus means paying acute attention. In typical organizations, managers provide this focus by holding lots of meetings harping and criticizing and expecting their people to react because of the pressure. But paying attention to pressure isn't where the control lies. Control, in PCT terms, means establishing a strong reference condition and establishing at every level of the perceptual hierarchy all the control systems necessary to control for the satisfaction of that reference condition. It also means making that control system strong enough to withstand other conflicts or disturbances which might cause a person to abandon the control. Managers can't do this for their people. The people must do this for themselves. But the manager is crucial in motivating people to start this process. The manager is also critical to helping people acquire confidence and skill to control for the organizational goals. More on this when we get to elements 3 and 5.

Doing this for a single person is difficult enough. Doing it for an organization of interdependent departments is a level of complexity greater.

Before I go further I need to digress briefly. I cannot explain how I implemented this step at Intel without talking about the specifics of both the manufacturing operation I managed and those I did not directly manage, but whose cooperation I needed for success. For those readers who are not already familiar with the language and elements of the manufacturing world, I want to describe this world in simplistic terms. I will oversimplify. My aim here is not to teach about manufacturing but to show how a single overall reference condition takes on so many

different forms inside the perceptual hierarchies of the various people involved, and what it takes to establish uniform control of the overall process.

So we hear from on high that we must improve on-time delivery performance significantly. Here are some of the functional groups that must perform just so to ship a complex system on time. By complex system I mean one of the first semiconductor add-on memory systems for IBM mainframe computers. These systems stood 6 feet high and 5 feet wide, contained 4,000 parts or more, 75 to 100 highly sophisticated memory and logic electronic circuit board assemblies, dozens of large and small power supplies, thousands of feet of cabling and connectors, hundreds of mechanical parts, numerous dials and panels, and sold for $500k to $1 million depending on memory size and configuration.

a. The **Planning** department must make a schedule for all the independent activities it will take to assemble, test, and deliver the system on time. They must coordinate these schedules with all involved. These schedules must be realistic. They must have a reasonable chance of being achieved.
b.   **Purchasing** must make sure that all 4,000 parts required to build the system are delivered on time
c. The **Stocking** department must receive all the parts, stock them until needed, and when the schedule demands, put them in required assembly kits so the elements of the system can be built on time.
d. The **Assembly** department puts all the elements of the complex system together.
e. The **Test** department must receive the system from the assembly department and put it through a full battery of tests to assure that it performs as it should and that there are no defects.
f. The **Quality** department oversees the whole process. They must inspect the system and its documentation at many points throughout the process, identify discrepancies, and assure that they are corrected before the system can ship. Failure at any inspection point may mean delay while a problem is corrected.

If you go to the manager of every one of these individual departments and ask them to accept the goal of 90% on-time delivery it is pretty easy to get them all to say yes. Why? Because, not one of them really controls that goal alone. They already know they have built-in excuses. Consider this. Of the six groups

above, four are directly involved in the production process (b thru d). If each of those groups performs all their tasks at 95% on-time level the manufacturing performance overall can never be better than 95%x95%x95%x95% or 81%. This is quite far from the 90% organizational goal. Each individual group has to perform at about 97% for the whole group to achieve 90% on time. So 90% translates to 97% at the department level. No one articulated that goal. No one in the departments even believed they could achieve that degree of control in their hundreds of daily tasks. The departments didn't have the processes in place to perform at that level of perfection.

Now consider the Quality organization which stands outside the actual production process— inspecting but not building or testing anything. They would agree to the 90% on-time shipment goal, but only as lip service, not as a real reference condition to control for. Why? Because their job was to inspect and make sure every quality standard was satisfied before shipment. They knew from experience that production made numerous mistakes and they had to stop a lot of scheduled activity for corrective action, causing schedules to be missed. They weren't measured on missed schedules. They were measured on how many mistakes they caught. So they said yes because it was politically correct, but were in no way committed to control for this organizational goal of on-time shipments. Yet, they could have a big negative impact on meeting the goal, always able to blame someone else for the failure.

So here are the problems and how PCT helped me implement solutions.

Start with the quality organization. In order to contribute to the 90% on-time shipment goal rather than just be able to detract from achieving it, they had to define things to control that on the surface seemed to have nothing at all to do with meeting schedules. When senior executives set the high level organizational goal, they probably weren't even aware of what it meant to the quality organization. And the manager of the quality department wouldn't be inclined to interpret this either. He was plenty busy dealing with his own day to day issues, and he wasn't even being measured or rewarded for on-time delivery. PCT helped me see this disconnect because now I was asking questions about what people were actually perceiving and what they were controlling for.

The Quality manager didn't perceive how he could contribute to on-time delivery without violating his charter. I went to the quality manager and had numerous discussions. I asked for his commitment to help meeting this goal. I helped him to perceive he could actually contribute to this goal and not sacrifice what he was chartered to accomplish. He could do this if he would consider moving inspectors right to the production line in process rather than at the end of the line. This change alone meant mistakes would be caught and corrected right in the process rather than at the end of the process where they would be cause for delay and retro-work on the system.

I helped him perceive that changing how his department did things not only helped the production managers meet the schedule performance goal, it helped improve quality. The production workers were getting more real time feedback about their mistakes and could correct them faster and better. By agreeing to control for on-time delivery, the Quality manager began to see how he was directly affecting the quality of the product, even though his people didn't actually touch it. Once he saw this, he was excited and motivated to look for other ways he could contribute. He was now engaged in the process of creating new control systems (at his organizational level) that would continue to contribute to the organizational goal of 90% on-time delivery.

Now let's return to the actual production organizations. They had to turn in levels of performance they never even thought possible. (Remember 97%). Well, the first step was helping them perceive that 90% meant 97%. That in itself was progress. They didn't know how they were going to do it, but at least they now knew what level of performance they had to control for. This was a beginning. I facilitated numerous individual meetings with department managers and also group meetings between them. I challenged them to think and create the solutions, which in PCT terms meant to establish the control systems in their groups that would enable them to reach the goal. There were so many changes needed, and there was no way I could define them all. But the groups, now engaged and empowered, began to define them. As they did so, more and better control was established, and they increased the amount of creative change they would take on.

3. Individuals set reference conditions for subgoals that will realize organizational goals

As a perceptive reader must realize by now, shipping a complex system on time requires control of hundreds of tasks and events across the organization. Getting the managers to define the specific goals for their departments and getting them to commit to focus and organize around achieving those goals is a major accomplishment. However, unless those goals become further interpreted and established as subgoals with attendant control systems in all the people under them, it is not enough.

Materials must get thousands of parts to the right place at the right time so the system can be built. Production must get the dozens of subsystems built and then integrated in the final system in time. Once the system reaches final integration and test it has over 4,000 parts and has been touched by dozens of people in the process. Test validates the final functional quality of the system before it is shipped to the customer. With so many parts and so much complexity there is a high probability that failures will occur. If failures occur they must be fixed, and then retested, all of which takes time, requires complex coordination and follow up, and is cause for missing the on-time shipping goal.

In other words—a lot of work requiring precise control, and this work is not done by the manager, but by the employees on the front line. Therefore, they too need to be just as committed to the goal as the manager and set up their own control systems around that goal. This may seem like common sense, and one would think it would be a natural consequence of the manager defining a new goal for the department. But it is neither easy nor obvious to people what they must do. This is because the worker's perceptual organization doesn't include anything related to this new goal. Take for example a test technician. He isn't tasked with meeting a schedule. He has a general sense that he is expected to accomplish his work in a timely fashion, but he has no specific control system set up to meet schedules reliably. What he does have are dozens of potential reasons for why meeting a schedule every day is in conflict with what he is tasked to do and what he is measured and reviewed against, namely doing a comprehensive test and assuring that there are no issues. Still, he is on the front line of discovering a

problem which will cause a delay. What he controls for when he does discover a problem is vital. A manager cannot 'police' all the different technicians and all the tasks they are involved in all day long. We need the technician to do this himself if we are to succeed in meeting this higher level of performance.

We must involve the technician and persuade him to control for this goal. This can most effectively be done by his manager. But the technician isn't going to accept this goal just because the manager says so. We have already shown that the technician will readily perceive all the conflicts that a focus on schedule will produce for him related to his primary responsibility. The manager must be skilled if he is to help the technician resolve these conflicts so that he is willing to control for schedule as well as his primary tasks. Just as I was able to deal effectively with the Quality manager and help him perceive how he could do this successfully and not compromise his primary responsibility, so also the managers of various departments were influenced to deal with their people to accomplish the same thing. This is where the techniques for applying PCT that I developed in collaboration with my mentors Ed Ford and Bill Powers come into play.

Here is a brief outline of the basics:

1) **Find out how a person's perceptual system is currently organized** as it pertains to work. You do this by asking and listening. How do they perceive their job, the department, you as the boss, their co-workers, other departments, goals and standards of performance for the group and for themselves?

Ask what they presently want, their goals. Ask them how they think others perceive them. These types of questions—if you listen carefully and with an understanding of PCT as the context,—will give a manager quite a bit of insight into how that person's perceptual system is organized and particularly what they might be controlling for at the time. Now let's apply this generalization to our specific case. Find out exactly how the technicians would perceive a goal to meet the schedule at a 97% level. If the manager facilitates an open and non-threatening meeting, encouraging them to engage in a thorough discussion, the manager will get an earful of all the reasons why it can't be done and in the process he will obtain

a very specific map of how the technicians are organized internally related to this goal. At this step it is absolutely critical not to make any value judgments, good or bad, related to what you are hearing. Any value judgments offered at this stage will almost certainly restrict the insight you can gain. People shut down (as opposed to opening up) when you tell them what you think.

2) **Ask the person(s) to make a value judgment** about what his wants, goals, perceptions, behaviors are or would be related to the new goal. For example: Do you think it is good for our department to not be serious about delivering on time? What will be the consequences to our business if we continue to disappoint customers with late or unreliable delivery schedules? Do you care about that? Do you perceive that you could focus on more than one key driver at a time? If you cannot, do you think that is a good trait or one that should be improved? Do you think it could ever be possible for you to combine a high concern for schedule performance and a high concern for quality? Would you be open to finding a way to do both?

3) **Ask the person(s) for a commitment** to become an active participant in the process of making the changes necessary to achieve this new goal. They, not you as the manager, must make this commitment. This is an extremely crucial step. It must be articulated by them. If you think this commitment is shallow, that's OK. As long as they articulate that they are willing to try, you can work with them with a high probability of success. Make it clear that you will hold them to their word.

4) **Cooperate with the person to work out a plan** to implement necessary changes. A successful plan should be focused on the single goal, written, specific and measurable. It should be a 'do' plan, not a 'don't do' plan. It should be possible to put the first step of the plan into action right away. The plan should have two commitments. 1) What the person(s) will do. 2) What you as manager will do to support them and ensure that the plan works.

The plan should define the means and timing for routine review and evaluation. The plan should be open to revision as the need arises.

4. Providing means for feedback

To effect control, evaluations must be frequent, timely, and relevant to the goal that is being controlled. This is clear to those who understand the structure of a control system. It is equally important and necessary at the organizational level. I used a daily startup meeting as the main vehicle for this. Many different organizations have used start up meetings to kick off a day's work. I did not innovate the idea of a daily startup meeting, but I did innovate the focus and dynamics of the meeting as well as the number of people involved—over 40 every morning at the beginning. This was a large number, representing about 25% of our total organization. Each morning, we reviewed results from yesterday and then defined only those tasks that were required to make today a success. Tasks often included set-up tasks that would make future days a success as well. I asked the group to define these tasks. I was careful not to define tasks for them. I needed evidence that these goals were adopted voluntarily by each person, not imposed by command from me. At first, this took a long time—often an hour and a half—and the meeting seemed sloppy and unfocused. The size of the meeting was criticized. Managers did not want so many of their people tied up for so long at the start of the day. I asked the managers of the various departments involved to attend so they could see for themselves what we were trying to accomplish. The managers were reluctant. They did not feel they had the time and they did not see the point. It was their people who would effect the control I was striving for, but I wanted the managers to know what I was doing, support it if they could, and at least not actively contradict what their people would be trying to accomplish.

We provided accurate and realistic evaluations. We devised charts and metrics and the responsible people presented them so the entire group could see how each part was doing. If someone failed to complete a task that was defined, I facilitated the interactions of the group to keep the evaluations constructive. Every failure had to be explained and the person responsible had to define what he would do to correct it for tomorrow.

The benefit of having all those people in the same room was that they all had common perceptions of the day's plan and clearly defined perceptions of the dependencies and commitments each player was making for the day. They began to see what establishing reliable control meant they had to do.

It would be impossible to describe all the detailed dynamics here. Suffice it to say that I managed and led the meeting, respecting the way the participants had organized their own perceptual systems around the goals, but nevertheless demanding accountability and results orientation. I applied the above defined PCT skills when appropriate to resolve any problems or conflicts that came up in the meeting. Occasionally, these issues were complex enough that they had to be dealt with in another venue. After several months the morning meeting was taking no more than 20 minutes and forty or so people had their activities for the day fully defined and integrated. Managers would pop in from time to time just to stay tuned, but they had developed full confidence that I was not undermining their department objectives. The performance improvement was remarkable. (See chart at end.)

5. Individual coaching using PCT skills

In addition to the daily startup meeting, numerous individual meetings were required with managers and key people to help them understand and to teach them how to control. Frequent one-on-one meetings were a natural part of the Intel communications culture, so these meetings were easy to arrange. These were critical to the success we achieved. When people trust a manager, they will open up and provide insight into how they have organized their own perceptual control systems. With this insight, and using the above defined PCT applications skills I was able to coach people and influence them to resolve their own conflicts—especially when they were trying to control several objectives at once, both on and off the job. It is interesting to note that the way I dealt with people in this process taught them how they might deal with others whom they needed to influence in a similar manner to resolve conflicts and attain results. So while my intent was to help them resolve a problem, I found that I was equipping them to be more effective with their peers and subordinates everywhere they went in the organization. These skills are teachable, but they require practice to apply reliably.

In closing, I want to say a few words about human needs. In my many years of managerial experience and most assuredly in this experience described above, I have observed that most (if not all) people control to fulfill needs for love, belonging, recognition, a sense of self-control and many other highly individual and sometimes surprising, even contradictory consider-ations, both inside and outside the workplace.

When managers interface with people in ways that are more aligned with the way they are designed internally, with sensitivity and competence, then their effectiveness with people increases dramatically. Since managers get paid to accomplish organizational goals through the influence they have with others, it is clear to me that applying PCT significantly increases the skill set a manager can use to accomplish goals.

The results speak for themselves.

Comparison of performance

Measure	Before program	After program	Benefits
Performance to schedule	23%	98%	Customer satisfaction
Overtime	12%	3%	$17,000 a month saved
Days of inventory	75	52	$2,100,000 reduction
Quality defects per unit shipped	1.25 dpu	.25 dpu	Cost savings & Customer satisfaction
Linearity	neg. 7.0 days off plan	± 1 day off plan	Productivity + 21%