

Feedback about Feedback

Contrasts between the Behavioral Science and Engineering Views

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The concept of feedback originated in the hard sciences, with applications in electronics, computers, servomechanisms and various cybernetic devices. The concept was adopted and adapted by the behavioral sciences but something has been lost in the translation. In this article, the technical origins of feedback are revisited — with an eye toward correcting what I view as past errors in translation. In short, this article is feedback about feedback. This article originally appeared in the Fall 1995 issue of Human Resources Development Quarterly (Jossey-Bass). This version has been lightly edited and the model of human performance it presents has been updated to reflect my current thinking.

Feedback: A Distorted View

The adoption by the behavioral sciences of the concept of feedback, a well-defined technical term, has not been without mishap. Nowhere is this clearer than in the feedback given as part of an employee’s annual or quarterly performance review. Much of what passes for feedback there isn’t feedback at all. At its worst, it is a mix of unfounded criticism, irrelevant personal judgment, and expectations that are being shared for the very first time. Positive and negative feedback, strictly utilitarian terms in their technical usage, have taken on affective shadings in the contexts of performance appraisals and interpersonal interactions. Positive feedback is viewed as complimentary, pleasing and, generally speaking, consistent with the recipient’s self-image. Negative feedback is seen as critical, apt to be rejected if not delivered skillfully, and almost as unpleasant to give as to receive. In both cases, feedback is seen as emanating from sources external to the recipient.

There is very little merit in the prevailing behavioral science view of feedback. It is far removed from its technical meaning and, being far removed, robs us of the full benefit of a very powerful concept. One aim of this article is to revisit the technical view of feedback and to stimulate its broader, better application. A second aim is to provide a framework for thinking about giving, receiving, and soliciting feedback regarding performance.

Feedback: A Technical View

I first encountered the concept of feedback as a young Navy technician, working on complex shipboard naval weapons systems. There, feedback was a technical term, with two special and different meanings.

In its first meaning, feedback referred to matation about an actual condition or position with respect to some ordered or required condition or position. For example, the gunfire control computer located in the plotting room on board the destroyers of my day calculated an ordered position that was transmitted to a gun mount (see Figure 1). The ordered position was received by a controller in the gun mount. It pared the gun mount’s actual position with its ordered position and any difference resulted in an error signal that was fed to amplifiers controlling the motors that positioned the gun mount. In turn, this caused the gun mount to

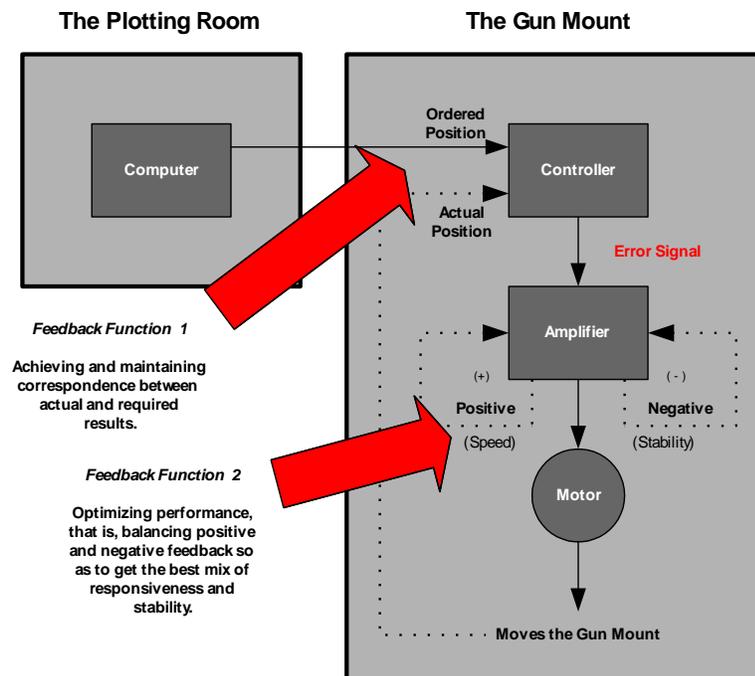


Figure 1 - The Two Functions of Feedback

move in a direction that reduced the error signal, thus reducing the difference between actual and ordered positions.

In its second meaning, feedback referred to a sample of the output of a system or circuit fed back as additional input. This kind of feedback comes into play in the amplifier controlling the gun mount's motors (see Figure 1). Samples of the output of the amplifiers controlling the motors that position the gun mount are fed back as additional input.

In this context, positive and negative have no value connotations but mean simply that the feedback has the same or opposite polarity as the input signal. However, the effects of these two forms of feedback are quite different. Positive feedback makes the system more responsive and negative feedback makes it more stable. Too much positive feedback makes the system too responsive; it becomes jittery. Too much negative feedback makes it sluggish. As a technician, finding the optimum balance between responsiveness and stability occupied many an hour of my time. As a consultant and executive it still does, although in a very different way.

The Purpose and Locus of Feedback

The preceding discussion illustrates two important aspects of feedback. First, the function of feedback is control. Feedback is used to control the gun mount's position and its movement. Said somewhat differently, feedback is used to obtain results and to regulate activity. Second, feedback is an integral feature of the system itself, not information from outside the system. As the example above shows, feedback occurs in the gun mount, not between the gun mount and the computer. As we shall see, this self-contained, self-governing aspect of the technical view of feedback has its counterpart in human performance systems.

The Goal is a Moving Target

Additional important points about feedback can be extracted from the preceding example. For instance, orders from the fire control computer typically reflect the fact that the ship and the target are moving. Change is continuous, not discrete. The gun mount must align itself with an ordered position and then remain aligned in the face of continuously changing conditions and requirements. Even the rate of change changes. Making requirements known and then responding to them under the guidance of feedback is not a one-time occurrence.

Feedback is Ongoing

If feedback is to be useful, whether it concerns outcomes or behavior, it must be timely and ongoing. Feedback regarding the actual position of the gun mount must arrive in time to keep it aligned with its currently ordered position, not some past position. This, in turn, implies monitoring and measuring the gun mount's actual position and communicating this information to the controller so as to continuously generate the error signal necessary to keep the gun mount in motion and in correspondence with its ordered position.

Error is Always Present—and Desirable

Owing to continuously changing conditions and requirements, to the fact that orders always precede the response to them, and to the fact that a body in motion tends to remain in motion, a gun mount is never in perfect alignment with its ordered position. Error is always present in any dynamic system. Because error is always present, there is a need not just for standards, but also for tolerances, for some acceptable margin of error regarding performance. Not only is error always present, its presence is essential to the proper functioning of a dynamic system. With no error signal, the gun mount would not move, it would remain wherever it happened to be. Error is essen-

tial if things are to change. Thus, error-free performance is not only unattainable but a certain amount of error is necessary to the proper functioning of the system.

People are not Gun Mounts

Unlike gun mounts, people have minds of their own. Their behavior is exactly that—their behavior. It is the means whereby they achieve the goals and objectives they have set. Unlike gun mounts, people do not simply do as they are told. Although the gun mount or technical model of feedback cannot be applied directly to people, the modification required to make use of it is surprisingly simple. About all that is necessary is to move the computer into the gun mount, to think of people as smart or self-directing gun mounts, as gun mounts with minds of their own. That includes memory and the ability to learn.

Feedback Occurs Naturally

The first thing to know about feedback in the context of human performance and behavior is that it occurs naturally. Contrived feedback is not necessary. Consider the diagram presented in Figure 2. It depicts a person whom we will call Sandy.

Sandy’s Actions are intended to control or influence some Target variable such as sales, production volume, error rates and so on. Sandy has Goals for that Target variable, which is to say she wants it to be in a certain state (e.g., sales of \$100K per month, a production volume of 1,500 units per day or an error rate of .05 per 100,000 pieces). All that Sandy knows of the current or actual state of T is by way of her Perceptions. This is true whether she observes the Target directly or by reading a report. Sandy compares her perception of the Target with her goal for it and if there is a gap, an error, she acts in ways meant to bring the Target variable into alignment with the Goal. There are almost always other actors and factors, other Conditions influencing the state of the Target, so Sandy’s actions have to compensate for the effects of these other actors and factors. Sandy obtains feedback in the form of her Perceptions of the extent to which the Target aligns with her Goal for it.

For practical purposes, we can say that Sandy’s behavior is governed by her perceptions of her behavior, its effects, and its consequences. (This arrangement, in concert with Sandy’s memory, is also her chief means of learning.)

Sandy lives and works in a world filled with other people. These other people, especially Sandy’s co-workers—and her supervisor if she has one—have expectations regarding her behavior and performance. These other people form their own perceptions of Sandy’s behavior, its effects, and

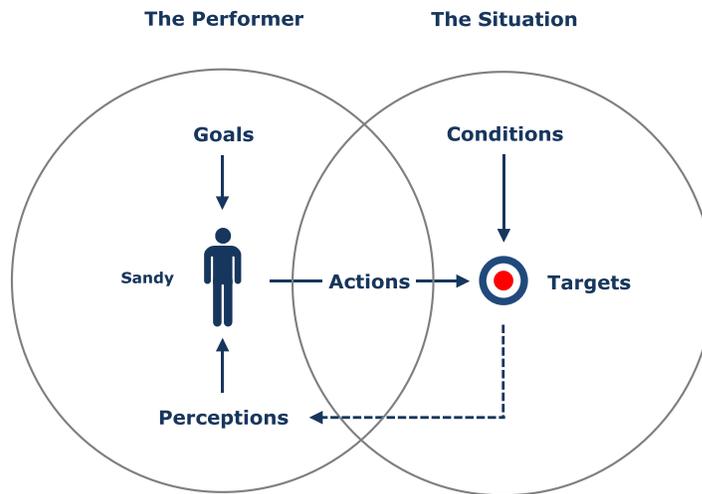


Figure 2 – The Target (GAP-ACT) Model

it consequences, especially its impact upon them and upon their goals. Like Sandy, these other people reach conclusions regarding the effectiveness, the efficiency, and the general utility or acceptability of Sandy's behavior. When they share their perceptions and conclusions with Sandy, this act of sharing is called "giving feedback."

If Sandy is a lathe operator, an assembly line worker, or a craft worker of almost any kind, and assuming she knows and accepts the work-related goals and expectations of management, it is quite likely that feedback from the task itself will suffice to keep her performance on track. The reason is that the link between Sandy's behavior and its effects is direct and immediate. In such a situation, external feedback is more or less superfluous (and often seen as intrusive).

But if Sandy is a senior executive, a psychiatrist, a research scientist, or anyone else whose work is characterized by results that are far removed in space and time from the actions that lead to them, obtaining feedback presents a challenge. Because the effects and consequences of her behavior might not be known for weeks, months, or even years, Sandy's behavior is no longer under the control of information about short-term, actual results. Because actual results are far removed in space and time from the actions leading to them, the control point or reference condition shifts to a subset of beliefs or expectations known as "professional judgment" and "sound practice." Sandy now does what she thinks, believes, and hopes is the right thing.

Ensure Goals and Expectations are Shared Up Front

Clearly, if Sandy is unaware of her manager's goals and expectations, she is not likely to meet them, except by chance. Obviously, establishing performance objectives is an important part of obtaining the desired performance from any employee. In most cases, these goals should be established in terms of the effects of the employee's behavior, not the behavior itself. What is wanted are results, not simple-minded compliance. Most important, Sandy should know of these goals and expectations before receiving any so-called feedback. If she doesn't, then what she hears isn't feedback but the sharing of expectations and goals for the first time.

Focus on Performance

Feedback from external sources is intended to influence performance. Performance is often confused with behavior and it pays to keep the two straight. When we speak of performance, we are referring to a complex mix of goals, expectations, behavior, and the effects of behavior. Behavior is a means to an end. The goal or end sought is a result of some kind. Results consist of or are brought about by the effects of behavior, but behavior itself is not the result sought (except in certain limited instances). Behavior may be overt or covert, but it is overt behavior that is manageable.

The effects of behavior vary with the closeness of their relationship to the behavior that leads to them. Some effects are immediate, others are delayed; and some effects are direct while others are indirect.

A special class of the effects of behavior is known as consequences. Consequences are those effects of behavior the person behaving perceives as traceable to his or her behavior and about which the person makes a value judgment. Consequences may be natural or contrived. I touch a hot stove. I am burned, I feel pain, I blister, and I continue feeling pain for some time. The blister and the pain are the effects of my behavior and its natural consequences. That I resolve never again to touch a hot stove is an effect or consequence, too, but one that is known primarily to me. Other people must observe my behavior over an extended period of time before they can conclude that I've learned my lesson. If my mother chides me for my foolishness, that too is a conse-

quence, but it is a contrived or imposed one and might or might not have any effect on me or on my behavior.

Make the Consequences Known

Frequently, people do not know the consequences of their actions until it is too late. This is especially true when the effects of behavior, instead of being immediate and direct, are indirect and delayed. And it is especially true when these effects consist of impact on other people.

Be Specific about Behavior and Its Effects

When giving feedback to an employee, it does not help to simply pass judgment. Feedback, to be useful, must provide specific information about behavior, its effects, and its consequences in light of previously established goals and expectations.

Your Goals and Expectations aren't Necessarily Mine — or Anyone Else's

As you might guess from the diagram in Figure 2, Sandy's goals, expectations, and perceptions might not be consistent with those of other people. There is always the potential for conflict in goals and expectations. This has implications for feedback.

In the gun mount circuitry shown in Figure 1, positive and negative feedback act to stimulate and to dampen the gun mount's responses. Regarding people, positive feedback acts to confirm behavior and negative feedback acts to disconfirm it. What is essential to understand here is that the classification of feedback as positive or negative is made by the person receiving it. A little story from my Navy days will illustrate.

While in a seminar with other organization development specialists, I had several testy exchanges with one of my colleagues. At the end of the day, he, in the company of some of his friends, confronted me in the hallway and announced, "Nick, I am really bothered by your behavior in the seminar earlier today. As a matter of fact, I am quite angry."

Technically speaking, his feedback was correct; he had "owned" his feelings and was apprising me of my effect upon him. His assumption, I believe, was that I did not wish to anger him. I was of the opinion that he was taking no responsibility for his reaction to me and that what he ought to be confronting were the underlying reasons for his anger. To his obvious surprise, I replied, "Gee, thanks for the feedback, Dick. I've been trying to pull your chain for weeks now and I had no idea until this very minute that I was being so successful."

His "feedback" was indeed feedback, but not of the kind he thought nor to the end he had hoped.

Don't Wait for Feedback, Go Get It

One mark of our maturity and security as human beings is that a key measure of how we're doing is progress regarding the attainment of our goals. These goals might be personal, professional, or job, task, or project specific. We are often able to obtain feedback on our own but, on occasion, and especially when the effects we seek to create are in or involve others, we have to solicit feedback. Our own conclusions aren't enough. If you want to know how you're doing, you have to accept the responsibility for finding out.

When seeking feedback, employ the same principles you would use in giving it. Focus on your performance, specify the goals and expectations in question, then examine the specifics of your behavior, its effects, and its consequences. Solicit feedback from more than one source. If one person tells you how he or she sees you, don't extend that same view to others. Check it out with

other people. Don't take one person's word for anything, except your effect upon that person—maybe.

Factor in the Long-Term View

People remember. They also learn. Effects and consequences, even when delayed or indirect, can and do have an effect on behavior and performance. Not all tasks or projects are or can be completed within a single appraisal period. Unlike the gun mount, which operates only in the “here and now,” people operate over extended periods of time. Factor in the long-term view when giving, receiving, or soliciting feedback.

A Summary of Sorts

Feedback is information about my performance. It might pertain to my behavior or to its effects or to both. In any event, it has meaning only in the context of my goals and perceptions. My behavior is my chief means of achieving my goals. It is governed largely by my perceptions of its effects and consequences (which, over time, shape my goals and expectations). All that I know comes to me via my perceptions—which might or might not be consistent with the perceptions of others. I would do well to keep all this in mind when seeking, giving, or receiving feedback.

A Checklist of Sorts

- As a supervisor, what are my goals for and expectations of the people who report to me? What are they at a general level and what are they specifically?
- What behaviors am I looking for them to display or not display? To what ends? What effects do I want them to produce? What are the effects I want them to avoid? Why?
- Where is improvement needed?
- What are the consequences of all this? For them? For me? For our unit?
- As a person being appraised, what are the goals and expectations for which I am being held accountable? Have I bought into them? Are they in conflict with my own?
- Which of my behaviors seem productive? Which don't?
- What progress am I making toward my assigned goals and objectives? What effects am I having on others? Where is improvement needed?
- What are the consequences of all this for me?

For Further Reading

When this article was first published, I was completely unaware of a marvelous book written by George P. Richardson, a professor of public administration at the State University of New York at Albany. George's book was published in 1991 by the University of Pennsylvania Press and is titled *Feedback Thought in Social Science and Systems Theory*. It is a comprehensive and eminently readable review of the two main threads of feedback thinking: cybernetics, and servo-mechanisms. Anyone with an interest in feedback, especially as it applies in the social sciences, is well served by reading George's book. (ISBN 0-8122-1332-7)

The theoretical basis for the Target or GAP-ACT model in Figure 2 is Perceptual Control Theory (PCT) as developed and articulated by William T. Powers. Two of his more salient books are listed below:

1. Powers, W., *Behavior: The Control of Perception* (1973). Aldine de Gruyter: New York
2. _____, *Living Control Systems: Selected Papers of William T. Powers* (1989). Control Systems Group: Gravel Switch

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