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Action Assembly Theory

of John Greene

Not long ago I received a late-night call from the dean of women at my college asking me to address a convention of five hundred student personnel counselors and administrators the next evening. She was in a bind because the featured speaker had canceled, and she decided to ask me because she knew I had strong opinions about student-staff relationships.

My mind whirled with thoughts on ways to approach the audience. A jumble of ideas flooded up as to the best way to capture their interest, win a sympathetic hearing, and sell them on close friendships with students. As soon as I agreed and hung up the phone, I began to sort through what I was going to say the following night.

John Greene's action assembly theory offers a currently evolving explanation for the mental process I went through to produce the message the audience finally heard. Greene's interest is the output end of the black box we call the mind. Specifically, he wants to describe the link between cognition and behavior—how thoughts get transformed into actions. As a teacher of communication at Purdue University, Greene is especially interested in the way we assemble our verbal behavior—how we put together what we plan to say.

Greene's explanation begins with a distinction between mental structures and mental processes. What you know about word processing on an IBM PC or Apple II may help you understand the roles of structure and process for information processing in the mind. The computer itself is the structure. What it does when we strike a function key is the process. Computer hardware is structure; computer software enables the hardware to perform a particular set of processes. A four-year-old boy at a playground explained to me the difference between mental structure and mental process without ever using those terms: "My mind is like a jungle gym. Thinking is like climbing all over it."

Green compares his theory of action assembly to building a model airplane from a deluxe kit that contains more pieces than are needed for a single plane. The project involves two structures and two corresponding processes. You start with an imposing assortment of plastic pieces (structure) and select which ones you'll use to build the P-51 Spitfire (process). You then take those parts and glue them in place (process) and end up with the completed model airplane (structure).

Greene takes care to distinguish between information retrieval and utilization:

The production of behavior involves two essential processes: (1) the retrieval of appropriate procedural elements from long term memory, and (2) the organization of these elements to form an output representation of action to be taken.³³

The job of constructing future actions in our mind is more complicated than the task of the hobbyist, but, as you'll see in the following sections, the structures and processes are similar.

PROCEDURAL RECORDS: IF-THEN-WHEN RULES

We make scale models from pieces out of a box. According to Green, we construct our actions from "procedural records" stored in the long-term memory of our mental black box. The data he's talking about aren't simple declarative facts about the state of the world—the sky is blue, the boy is young. They are records of the consequences that came from actions taken in specific situations. Think of them as if-then-when rules gleaned from past experience. Even while the dean was finishing her request, one of those rules popped into my mind:

If I tell a story about something dumb I've done,
then the audience will laugh and enjoy themselves,
when they are predisposed to be friendly.

Once I consider listener enjoyment as a partial aim of the speech, I can access hundreds of if-then-when rules that are appropriate to that goal. Some of these are highly abstract. (If I'm transparent and share something of myself, people will like me, provided the content of my self-disclosure isn't too shocking.) Others range downward to the concrete level of specific motor action. (If I raise the corners of my mouth, the audience will think I'm happy, as long as tears don't counteract the expression.)

Note that the specific goal of a procedural record can be an action, feeling, or belief, and the entire if-then-when sequence may operate below the conscious level. Each of these rules is stored in my mind because at least once in the past I spotted a connection between something I wanted and an action I took in a specific setting. Students of rhetoric may remember that the Roman teacher Quintilian taught that the good orator must be able to draw upon a treasury of eloquence, a storehouse of wisdom.³⁴ Consistent with that imagery, procedural records are personal nuggets of truth about past behavior stockpiled for possible future use. If Quintilian was right, the effectiveness of a speech de-

depends on the quantity and quality of procedural records a speaker can tap when preparing a message.

Just as parts of a model plane come in different sizes and importance, procedural records have different levels of strength. Some are mere scratches that barely leave a trace in our minds, while others are well-worn paths in long-term memory. According to action assembly theory, the more a procedural record has been exercised, particularly in the recent past, the stronger it gets.

The procedural record about disclosure of a personal foible came to my mind so quickly because I often make a conscious choice for transparency over guardedness. I gouged a deeper groove earlier that day by telling a student about a stupid comment I had made to my son about his taste in clothes. But even procedural records in our personal Top 40 remain silent on the turntable of the mind until an appropriate goal sets them spinning. Greene labels that process “activation.”

THE PROCESS OF ACTIVATION

Greene believes information retrieval isn’t random. Just as the hobbyist has a method of selecting the pieces when there are too many parts in the box, so the mind has a systematic and predictable selection process through which some procedural records are activated while others remain dormant. But it’s at the point of conscious choice where the analogy fails. Greene doesn’t believe that we have the same high level of control over our procedural records that model builders have over their materials. If the model builder’s control over the plastic parts matched the low level of control we have over our procedural records, the airplane parts themselves would decide which of them would be used in the final design.

I said earlier that my procedural record about self-disclosure had “popped to mind.” In order to understand what Greene means by activation, it may be helpful to picture the mind as a giant popcorn popper with great capacity. Each if-then-when linkage we’ve ever stored away is like a single unpopped kernel of corn.

Pretend that you have mixed together samples from different jars. The fresh kernels are ready to pop at the slightest exposure to heat, but the stale kernels would need a blowtorch to get them to jump an inch. Since this is fantasy, think of each kernel as reusable (able to pop over and over). The ones that have popped often and recently are primed to go through the roof. It’s as if practice made perfect.

Now imagine plugging in the machine without the plastic cover in place. There would be a brief delay before the kernels burst into the air. Greene says it takes about ten milliseconds for the heat of goal direction to energize dormant action ideas in our minds. But since activation is a process that occurs below the level of consciousness, it requires no central processing capacity. When the popcorn does explode, the kernels that hit the ceiling or clear some

threshold self-select themselves to be packaged and used. The weaker if-then-when kernels are likely to stay on the bottom of the cooker, just like our dormant procedural records.

Let's push the analogy a bit further. It is possible that some kernels have the potential to hit the ceiling, but their explosion is muted because they weren't in the hot center of the heating unit. In like manner, some procedural records don't come into play because the conditional part of the if-then-when sequence doesn't match up well with the present situation. The when portion of my self-disclosure-for-fun procedural record requires that the audience like me. If I suspect they'll be less than enthusiastic about their substitute speaker, the rule isn't relevant, and I won't use that particular if-then-when guideline as I prepare my message.

There are other reasons why many procedural records aren't activated. They may not have the strength to reach the threshold because we don't exercise them enough. Or perhaps there is only a slight overlap between the context in which they originated and the present circumstances. Yet despite the many procedural records that fail to make the grade, Greene would claim that

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hundreds of them were activated in my mind that night of the phone call. According to action assembly theory, it then became my mind's task to pull them together into a unified "output representation."

OUTPUT REPRESENTATION: AN ACTION PLAN TO REACH THE GOAL

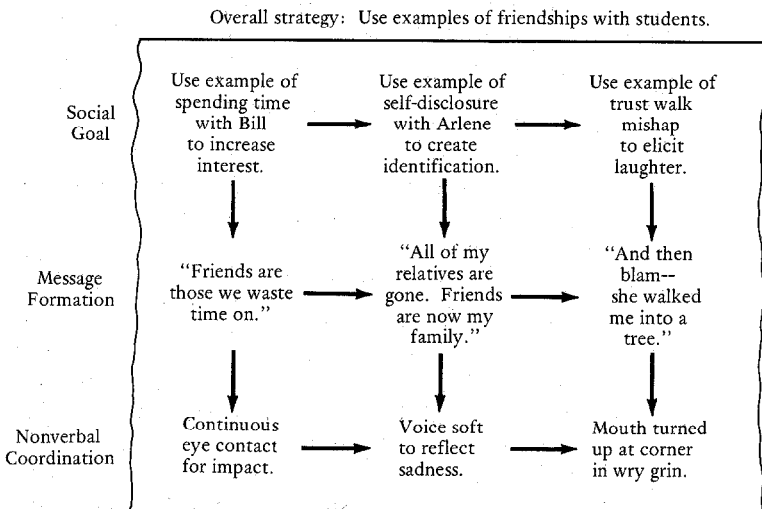
Greene says that the assembly of activated procedural records is the "output representation of action to be taken."³⁵ It is the finished mental product, the completed model airplane, the final design for the message on friendship completed just seconds before I actually deliver it to the student personnel staff. Output representations are action plans that break out into actual behavior. Figure 11-1 shows part of my mental structure for that speech.

Greene would note three things about this action plan. The first is that it's a hierarchy that gets more specific as we move from the top to the bottom. The upper level is like a blueprint or general script. The lower level is much too detailed to be thought out ahead of time. But he says that it is "possible to effectively control output by specifying an abstract behavioral plan and allowing lower-level operators to refine and concretize that plan."³⁶

Second, the social goals exercise a top-down control of items lower in a given column. There were lots of chuckles when decathlon star Bruce Jenner showed up at the Olympics wearing a T-shirt that proclaimed, "Feet, don't fail me now!" The smiles were tacit recognition that action plans for running fast or jumping high automatically activate the feet.

Greene points out that word selection is relatively automatic and

Figure 11-1 Partial Structure of Action Plan on Friendship Speech



nonverbal behavior is almost always unconscious, but each is constrained by the nature of social goals. For example, there are many ways to show sorrow, but the reference to lack of living relatives in the middle column rules out a blustery style of delivery. That filter-down influence doesn't extend to actions in other columns. Although a wry grin would be out of place as punctuation for a reference to the death of parents, it fits the image of walking into a tree.

Third, actions on the same horizontal level can only be planned one at a time. The mind is a powerful computer, but it still has a finite central processing capacity—a limited work space. Activation of if-then-when rules takes time but doesn't use up any central processing capacity. Coordinating moves within the same vertical column doesn't require extra time or clutter our mental work space. But planning sequential actions on the same level takes significant time and central processing capacity. That's why Greene and others use the time it takes a person to react to a message as the chief measure of cognitive activity. Long delays are a sure sign of mental preoccupation.

THE PROCESS OF ASSEMBLING AN OUTPUT REPRESENTATION

You may have noticed that in the last section we have already begun talking about the assembly process. It's hard to explain the action plan structure without referring to the process that creates it. Hopefully a summary of the ideas presented so far will help you understand the relationship.

Action assembly theory suggests that our long-term memory contains thousands of procedural records which link past behaviors with their consequences. These if-then-when modules have varying degrees of strength according to how often and recently they've been used. A given unit is activated to the degree that the situation in which it was formed matches the circumstances surrounding our present goal. Highly activated procedural records are assembled into an outcome representation mosaic layered in different levels of abstraction. Although each level is relatively autonomous, abstract concepts hold sway over associated concrete moves. It's this action plan that is ultimately expressed in behavior.

Is there anything left to say about the assembly process? Certainly. Most model builders aren't content to construct a single airplane. They want to create a squadron....a wing....an air force! While each plane has unique features, some components are interchangeable. Many flying models use the same 0.49 cc gasoline engine. The builder can store the engine assembly as a completed unit and pull it off the shelf, ready to go, at any time.

Action assembly theory says the same thing can happen with a unitized batch of procedural records. Assembling a sequence of skills that results in a grooved, repeatable behavior may take hours of mental concentration. But once we've mastered it, the whole procedure becomes in effect a single if-then-when unit of great strength. The series of moves that once required great time and mental effort to pull together can now be activated at will without using any

central processing capacity. A smooth golf swing or a firm handshake is like that. Each activity takes a concentrated effort at the beginning, but once we've become adept at it we can literally do it without thinking.

Politicians speak on the same topic before many audiences. Without notes, they can retell the same story almost word for word with maximum effect and with minimum effort. They seem to have followed Aristotle's advice that the speaker must master a batch of rhetorical topics that can serve in almost any speaking situation (see Chapter 25). Action assembly theory would say they have developed a series of unitized assemblies that are easily activated.

EVIDENCE OF ACTIVATION AND ASSEMBLY IN THE MIND

I've used a public speaking example to illustrate action assembly theory because most of Greene's research has been in the arena of speech. To determine the extent of mental processing, he measures the length of silence before a speaker's response to a question and also the number of nonfluencies that occur during the answer. A nonfluency is any pause, repetition, filler word, or misstatement that interrupts the flow of delivery. Greene considers pauses of over a quarter of a second and *ers*, *abs*, and *ums* as evidence that the mind is engaged in activation and assembly. He regards a break in eye contact as an indication that central processing capacity is taxed to the limit and the speaker is unable to think about anything else.

Greene has verified what your public speaking instructor told you the first day of class—there's no substitute for thorough preparation. If you assemble the action plan in advance, you'll have both time and presence of mind to concentrate on the audience and their response. But if you are making it up as you go along, the speech will take all of your mental energy and you'll have no remaining capacity to adjust to listener feedback.

The theory also has application to the practice of deception. Lie detectors measure internal signals of physiological arousal, but there are also outwardly visible signs that correlate with the stress of lying. These include heightened voice pitch, shoulder shrugs, pupil dilation, and verbal nonfluencies. Most liars work hard to inhibit the top-down influence that the goal of deception would normally exert on their nonverbal behavior. In order to avoid detection, they must think through their words and gestures very carefully. This effort overloads the central processing capacity of the mind and results in a much slower rate of speech and an avoidance of eye contact. Of course the liar's remedy is to rehearse the falsehood until it becomes a unitized assembly. Beware of fast-talking salesmen.

CRITIQUE: SECOND THOUGHTS ABOUT ACTION ASSEMBLY

Since Greene has written a widely circulated article on the criteria for a good cognitive theory, it seems only fair to judge action assembly by the principles he

presents. Most of these are consistent with the standards given in Chapter 1, but he also suggests one novel requirement.

Along with every other scholar, Greene believes a good theory should explain what is happening. For a cognitive theory, that means describing the structures of the mind and the processes that play over them. He does this admirably. His insistence that we have nothing to learn from neurological studies of the brain is somewhat puzzling, but his theory is a comprehensive explanation of why we do what we do.

Greene argues for powerful theories that predict across a broad landscape rather than concentrate on single variables. There's no doubt that his theory makes bold predictions about cognitive process, but his forecast seems a bit timid when he gets to the resultant behavior. Claiming that preparation and practice will smooth out nonfluencies is not exactly going out on a limb. The theory breaks no new ground; every prediction it makes about behavior has been made before.

Greene calls for "an empirical theory with potentially falsifiable hypotheses."³⁷ Some of the articles cited at the end of the chapter report experimental results consistent with his conceptions of mental structure and process. But he's the lead author in all of those reports. There will be increased confidence in his theory when it sparks a research interest in scholars not under his direction.

Greene makes a good case for verifiability outside the lab. He claims that a theory should square with accepted general knowledge, and it's this proviso that raises a question about the validity of his predictions. He says that procedural records will be activated today only if they have proved helpful in reaching a goal sometime in the past. If this is true, people ought to become constantly more effective in reaching their goals. Greene might respond with the proclamation that comes from an earlier age of optimism: "Every day in every way we get better and better." But saying it's so doesn't make it so. The fact that many people fail to learn from the past is a serious blow to Greene's theory.

Greene introduces a final standard that delights some and exasperates others. In addition to being scientifically respectable, he thinks a cognitive theory should be aesthetically satisfying.

As with any form of artistic expression, scientific theories can function to reveal the structure and beauty of the subject. Further, . . . theory may provide pleasure through contemplation of the elegance of the theory itself.³⁸

Beauty is in the eye of the beholder. As you may have noticed in the introduction to this section, the terminology of cognitive processing is ponderous. Action assembly theory is no exception. Given Greene's call for artistic appeal, one has to assume he finds its intricacy a great source of satisfaction.

Greene acknowledges that his formulation is too complicated to be tested

by any single empirical study. He has expressed a fear of creating a simplistic theory that fails to capture the complexity of the mind. He need not have worried. But most students who invest the effort to understand Greene's ideas conclude that he has closely approximated what is really going on in the mind.

A SECOND LOOK

Recommended resource: John Greene, "Action Assembly Theory: Metatheoretical Commitments, Theoretical Propositions, and Empirical Allocations," in *Rethinking Communication*, Vol. 2, Brenda Dervin, Lawrence Grossberg, Barbara J. O'Keefe, and Ellen Wartella (eds.), Sage, Newbury Park, Calif., 1989, pp. 117–128.

Original statement: John Greene, "A Cognitive Approach to Human Communication: An Action Assembly Theory," *Communication Monographs*, Vol. 51, 1984, pp. 289–306.

Further development: John Greene, "The Stability of Nonverbal Behavior: An Action-Production Approach to Problems of Cross-Situational Consistency and Discriminateness," *Journal of Language and Social Psychology*, Vol. 8, No. 3, 1989, pp. 193–200.

Pauses as signs of thought: John Greene, Sandi Smith, Ruth Smith, and Joan Cashion, "The Sound of One Mind Working: Memory Retrieval and Response Preparation as Components of Pausing in Spontaneous Speech," in *Communication Yearbook 10*, Margaret McLaughlin (ed.), Sage, Beverly Hills, 1987, pp. 241–258.

Speech preparation study: John Greene, "Speech Preparation Processes and Verbal Fluency," *Human Communication Research*, Vol. 11, 1984, pp. 61–84.

Deception study: John Greene, H. D. O'Hair, Michael Cody, and Catherine Yen, "Planning and Control of Behavior During Deception," *Human Communication Research*, Vol. 11, 1985, pp. 335–364.

Cognitive theory evaluation: John Greene, "Evaluating Cognitive Explanations of Communicative Phenomena," *Quarterly Journal of Speech*, Vol. 70, 1984, pp. 241–254.

Measures of cognitive process: John Greene, "Cognitive Processes: Methods for Probing the Black Box," in *A Handbook for the Study of Human Communication*, Charles Tardy (ed.), Ablex, Norwood, NJ., 1988, pp. 37–66.

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- 33 John Greene, H. Dan O'Hair, Michael Cody, and Catherine Yen, "Planning and Control of Behavior During Deception," *Human Communication Research*, Vol. 11, 1985, p. 339.
- 34 *Quintilian*, Vol. 4, H. E. Butler (trans.), Harvard Univ., Cambridge, 1961, Book XI, Pt. 2, p. 213.
- 35 John O. Greene, "A Cognitive Approach to Human Communication: An Action Assembly Theory," *Communication Monographs*, Vol. 51, 1984, p. 295.
- 36 John O. Greene, "The Stability of Nonverbal Behavior: An Action-Production Approach to Problems of Cross-Situational Consistency and Discriminativeness," *Journal of Language and Social Psychology*, Vol. 8, 1989, No. 3, pp. 193-220.
- 37 John O. Greene, "Evaluating Cognitive Explanations of Communicative Phenomena," *Quarterly Journal of Speech*, Vol. 70, 1984, pp. 241-254.
- 38 John O. Greene, "Action Assembly Theory: Metatheoretical Commitments, Theoretical Propositions, and Empirical Applications," in *Rethinking Communication, Vol. 2 Paradigm Exemplars*, Brenda Dervin, Lawrence Goldberg, Barbara J. O'Keefe, and Ellen Wartella (eds.), Sage, Newbury Park, Calif., 1989, p. 117.
- 39 Walter H. Crockett, "Cognitive Complexity and Impression Formation," in *Progress in Experimental Personality Research*, Vol. 2, B. A. Maher (ed.), Academic Press, New York, 1965, pp. 47-90.
- 40 Brant R. Burleson and Michael S. Waltman, "Cognitive Complexity: Using the Role Category Questionnaire Measure," in *A Handbook for the Study of Human Communication*, Charles Tardy (ed.), Ablex, Norwood, N.J., 1988, p. 15.
- 41 Plato, *Gorgias*, W. R. M. Lamb (trans.), Harvard Univ., Cambridge, 1967.
- 42 Jesse Delia, Barbara J. O'Keefe, and Daniel J. O'Keefe, "The Constructivist Approach to Communication," in *Human Communication Theory*, Frank E. X. Dance (ed.), Harper & Row, New York, 1982, p. 167.