THE ELEMENTS OF SKILL

a conscious approach to learning

Theodore Dimon, Jr.

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For my mother, Themis Dimon, who through her patience and understanding taught me what it means to be a teacher

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Foreword

Building on the work of John Dewey and F. Matthias Alexander, Theodore Dimon, Jr. has given us a blueprint for learning that is both attractive and accessible. *The Elements of Skill* locates learning neither in "the mind" nor in "the body," as many philosophers, psychologists, and educational theorists have tended to do, but in the organism as a whole as it interacts with its environing conditions.

Like Dewey and Alexander, Dimon avoids rote exercises and drills, thus rejecting what he correctly describes as the false dichotomy between technical skill and bodily coordination. Like Dewey and Alexander, he emphasizes informed and intelligent efforts to balance the respective roles of means and ends within the learning process. He recognizes that ends-in-view must be neither inflexible nor vague, and that the means to those ends must undergo continual re-adjustment in the light of emerging conditions. And like Dewey and Alexander, Dimon is not focused on how particular skills are learned. He wants to teach us how we can learn to learn. Dimon's challenge to learning is thus primarily forward-looking and preventive in nature, rather than simply curative and remedial. He is concerned with fundamental changes rather than the treatment of symptoms. His approach to learning delivers a challenge. It demands the expenditure of intellectual and moral energy rather

than promising cheap and easy results. The potential rewards of applying the lessons of *The Elements of Skill* are considerable: enhanced appreciation of the role of experiment in learning; new perspectives on problem-solving; and a greater measure of self-control. As Dimon demonstrates, these rewards are available to all of us.

—Larry A. Hickman, Director, The Center for Dewey Studies, Southern Illinois University, Carbondale

Introduction

From a young age, all children are actively engaged in the process of learning skills. Balancing on two feet, walking, running, grasping and manipulating objects, vocalizing and beginning to use language—most of us learn these activities almost entirely by instinct. After the first few years, we begin to learn more advanced skills, such as reading and writing, with the help of teachers. By the time we are adults, we can perform a fantastic array of activities with perfect ease—running, climbing, catching and throwing, swimming, riding a bicycle, handling tools, driving, typing, and speaking, to name a few.

Learning more difficult skills, such as dancing, hitting a baseball, and playing the violin, is not so simple a matter. Real competence in these skills is not the rule but the exception. Many of us achieve moderate ability to play an instrument or a particular sport, but real accomplishment is quite rare. For many of us, the process of learning a musical instrument or a sport is an exercise in frustration. We watch as others seem to progress almost effortlessly, while we ourselves seem never to get past a certain point. With time, we give up, mostly because we never get good enough to really enjoy what we are doing.

For the most part, we accept these failures as a fact of life, as part of the commonly-held view that some people are talented but most

are not. The truth is, failure does not have to be the norm, and when kids or adults do fail, it is largely the fault not of ourselves but of bad teaching and incomplete knowledge about how we learn and how we function. Not every kid who has violin lessons is going to become a Heifetz, or every kid who plays baseball a Ted Williams. But this comparison is a poor excuse for anyone simply failing to learn the basics of playing an instrument or hitting a baseball. And yet that is the reality with many kids today, for the simple reason that we do not take the process of skill-learning seriously and have failed to understand the most fundamental issues involved in learning to do things.

In this book, I want to explain first why beginners fail to learn, and to discuss the widespread and faulty ideas about teaching and learning that contribute to such failures; and second, to present a new approach to learning skills based on an understanding of the mental and physical processes that govern how we learn.

My interest in this subject stems from an awareness, which I developed at quite a young age, of how many kids in school were struggling to learn such basic skills as writing, catching a ball, and speaking—and not getting the help they needed. I knew the schools were failing these kids, and by the time I was a teenager I had formed the idea of starting a school that would provide the missing elements. Apart from offering more supportive teachers, however, I did not have a fully developed idea of exactly how to achieve this goal until several years later, when I began to study piano and experienced crippling tensions during practice. During this time, I made a detailed study of the literature on movement and performance and, on the basis of this knowledge, began to figure out how to gain increased coordination at the piano. I realized then that, at the core, my problems at the piano were basically the same as those I had observed in children throughout my school years. In order to gain more expertise in the field, I entered a training program in the kinesthetic method developed by F. Matthias Alexander. Soon after that, I went to graduate school in education where I began to formulate my own ideas on the subject.

The problem of learning skills, I discovered, has two components that are basically being ignored. First, when we learn a skill, the idea that we must try to perfect our actions is so basic that few would question it. But skills consist of a number of complex elements, and asking a child to simply perform actions, and then coaxing and cajoling him into doing them better, hardly does justice to the complex reality of what is involved in skilled activity. Swinging a baseball bat, hitting a tennis ball, playing a piece of music on the piano—these skills are actually composed of a number of elements, each of which can be isolated and worked on to ensure success. The first component of learning a skill, then, is to break it down into manageable parts.

Along with the inability to break skills down goes the problem of trying too hard, which prevents the child from discovering the various elements that make up a skill. Few people, when learning something new, want to stop and think about what they are doing, to experiment, to play with different approaches. We want to improve quickly, and we fail to realize that learning a new skill demands, first and foremost, the ability to stop trying to be right and the courage to try something we've never done before. Often it is the act of not trying, of stopping and thinking, that is the key to learning. The key to doing something is to stop doing it as you have always done it.

This brings us to the second component of learning skills. Skilled performance may seem, on the surface, to be primarily about actions—things we do—but this is not in fact the essential ingredient of skill. Every action we perform, however simple, is the product of a complex psychophysical process that, for most of us, is entirely unconscious. If, as often happens, we are able to learn by instinct, we do not have to pay attention to this process or understand its central role in learning. But what if we have acquired harmful habits that interfere with this process? Then the very attempt to perform the skill only further weds us to whatever harmful habits we bring to the process, with the inevitable result that we fail and continue to fail in spite of our best efforts. In order

to address this problem, we must make the process of learning more conscious by gaining an improved control over action.

This isn't to say that all methods of learning are wrong or that, even when they are incomplete, everything in them is wrong. Many techniques of learning encompass valuable elements. Dancing and singing and athletic instruction often take into account how the body works; piano teaching often encompasses the essential idea of clearly conceptualizing what notes need to be played. But these elements are often imperfectly understood and applied because, in conceiving specific pedagogies aimed at particular skills, the psychophysical process underlying skilled performance is ignored. As I will show in the following pages, the one element underlying each of these skills is the self—the functioning mind and body—as the central instrumentality upon which all learning depends. The human body is a marvelous instrument, but we have only begun to appreciate its full potential for improved functioning and control, and the possibilities it holds for mastering action at the highest levels. In examining this element of skill, my purpose is not to argue a theoretical point of view, but to introduce a new area of knowledge—that is, how to achieve a higher level of skill through a new principle of intelligent mastery of the self. This knowledge, I believe, will lead to an entirely new approach to learning.

To some readers it may seem rather harsh to say that most kids are failing, or that the methods we currently employ are inadequate, especially since there are so many success stories in various areas of learning. But for every piano student who achieves competence, there are perhaps ten who fail to improve; for every top athlete, a hundred who are mediocre. Failure to improve at complex performing skills, in fact, is more the rule than the exception. Particularly in school, our fate is left largely to chance. If we can't learn effectively, we sit on the bench in sports or are written off in music class as untalented. Often we are taught by individuals with virtually no understanding of how to teach. Eventually we decide that we have no talent and give up. In school, the success of a teaching method is often determined not by whether it addresses the

fundamentals of learning, but by the superstars it can produce; the rest of us are left on the sidelines.

But we are all capable of mastering basic skills; if we don't, it is the teaching method, not the student, that must be questioned. At the root of these problems is the fact that the teaching of skills is still at a primitive stage. As recently as several decades ago we still held to the idea that the mind is a blank slate, and that teaching is largely a process of drilling ideas into kids' heads. Our theories about cognition and learning have advanced since then. But the counterpart of this notion—that learning skills mainly involves mechanical repetition—remains the basic concept behind today's most sophisticated performance pedagogies.

The key to learning skills, however, is not mechanical drilling but applying insight and intelligence to the process of learning. Skill is not so much a matter of reproducing certain movements as it is knowing what to pay attention to, how to intelligently break down problems, and how to direct one's own bodily activity through conscious awareness. The old notions of teaching that encourage the learner to perform and perfect actions are crude at best; to fully succeed the learner must have an understanding of the mental and physical processes that govern his attempts at learning.

At the deepest level, mastery of skill is about inner development. It is a way of acquiring discipline; it is a way of increasing awareness and control in action; and it is a vehicle for insight into the mind and body. In the East, the mastery of a martial art is traditionally considered a path of inner development—not just of muscle and movement, but of character, awareness, and insight. In the West, mastery of a skill is usually seen as a ticket to money or fame—and sometimes to a breakdown in health. When we value skills not in terms of virtuosity and competition but self-mastery and inner development, we will then perceive the true educational challenge that they pose of uncovering our fullest potential.

It may appear that because this books deals with the general problem of learning skills it can't provide the depth and detail required for study of any skill in particular. This may be true but it misses the point. The techniques specific to a particular skill are

often less important than they seem. Impediments to learning usually have little to do with specific technical issues, and everything to do with a much more basic and unrecognized problem. The foundation for learning any skill is the reliability of our own habits and functioning, and this subject simply cannot be addressed by specific pedagogies.

A few words about the structure of the book. All learning difficulties appear complex when looked at in their entirety, but by first breaking problems down and approaching them in logical steps, simple solutions can often be found. In Chapter One, I begin by discussing basic learning blocks and suggesting practical ways of overcoming them. In Chapter Two, I dissect some of the subtle components of skilled activity that are often overlooked, showing in a general way how crucial these factors are in approaching learning problems intelligently.

In the following four chapters of the book (Chapters Three through Six) I turn to the essential and largely unrecognized role of the self in learning. I begin by looking at the problem of tension in performance, and show how the learner can improve performance by becoming aware of these tensions. In the following chapters, I apply this practical concept of body awareness to performance anxiety and to the problem of mastery of complex performing skills.

In the final two chapters (Chapters Seven and Eight), I show how these basic concepts of the awareness and control of habit apply in concrete learning situations, including an apprehensive driving student, a tennis novice trying to master a backhand, a singer, a pianist, and finally the highest level of achievement, the attainment of conscious mastery through awareness of the self in action.

CHAPTER ONE

Learning How To Learn

1. The Learning Paradox

How do we learn a new skill? The answer to this question is so basic that few of us give it much thought: we go to a teacher who shows us what to do, and we then attempt to do it. The teacher corrects our movements until slowly, with practice, we "get it." This process is built upon, over and over, until we eventually master the entire art. This method of learning, in fact, is so culturally ingrained that we hardly think about whether it works or not. Skills consist in being able to "do" certain things, so we have to find someone who knows how to do these things, and then learn to master these actions for ourselves.

In this book, I am going to approach the problem of learning skills in a new way—that is, based on the principle not of doing but of awareness and attention to oneself as the most crucial element in learning. In most systems of learning, so much energy is focused on what we are trying to do that we often lose sight of and even undermine the efforts of the person trying to learn the skill in question. Many people of course succeed perfectly well by approaching skills in this way. But this method of learning fails to take into account the most basic, central factor in learning—namely,

ourselves. As I will show in this book, when we are able to approach learning based not on concern with what we are doing but a clear understanding of the process of how we do things, then we will have at our command all the elements most essential in acquiring skill. This makes it possible to go far beyond what one can achieve through traditional methods of learning, and to tap into a potential greater than what we have presently conceived in traditional pedagogies based on drilling and doing.

The Paradox of Effort

Many years ago, when I was first starting to teach, a child was sent to me by his mother, who said that when he wrote at school, he tied himself up in knots and couldn't write legibly. His teachers, who felt that he needed more practice, encouraged him to work harder at his penmanship. He was also sent to a specialist who gave him a number of exercises designed to improve his motor coordination. In spite of this advice, however, no one had been able to help Josh, for the simple reason that his teachers were so focused on what he was doing—on getting him to do the right things—that they could not see how he was quite literally trapped by his own efforts. What made matters even worse was that all the help Josh was given by his teachers further reinforced his already harmful tendencies, with the result that his problem got even worse. By the time Josh came to me, he was struggling to form his letters, gripping the pencil so tightly and working so hard to control it that his letters had become even smaller and more illegible.

As I will show in this book, Josh's writing problem is far from unique, but it is symptomatic of a fundamental and complex problem that has virtually gone unnoticed in educational theory. Since I began teaching more than twenty years ago, I have seen literally hundreds of people—both children and adults—who struggle in a similar way to Josh, but whose problems are left unsolved because they are focused on what must be learned and not how it is being learned. In this book, I want to look at this basic problem of how we do things, show how it is at the root of many

learning problems, and demonstrate how attention to this factor can quite literally open the way to a whole new realm of understanding and competence. Often when we are having trouble learning to do something, we focus on what we have to do—on things we must positively learn—when in fact that problem isn't what we can or can't do; the problem is something in us. This whole book is going to be about us—about how we learn, how to approach skills intelligently, and how to gain greater control over the primary instrument in learning: ourselves.

Bound Responses

To return to Josh and his writing problem, how can we help him out of his difficulties? As I said, Josh's problem is by no means simple; later I will talk about its various aspects in more depth. But because his teachers were so concerned with Josh's performance, they failed to notice that his writing problems were entirely associated with his faulty actions. Circumventing these tendencies suggested an elegant and simple solution to his problem. Instead of asking Josh to write, I told him that I wanted to do some drawing; to this end, I asked him to gather a couple of crayons and to make some large circles. After he did this for a minute or so, I told him to try making the circles smaller and smaller, until he could make a very small circle without any sense of strain and struggle. This new strategy worked. By getting him to draw instead of write, he stopped using the tension he associated with writing and could then form letters without tying himself into knots.

At the simplest level, then, we can begin to unravel Josh's problem by finding an alternative to his normal way of doing things. The problem in almost all forms of learning is that we get stuck by our own trying—stuck into ways of doing, into tension, into bad habits. The harder we try to make things right, the more we get in our own way. We have to learn instead to do something different, to focus our attention in a new way. We are then able to do easily what seemed so difficult.

This kind of learning can be simple but—as I will show in the rest of this chapter—it is a basic and effective way of approaching problems that seem intractable. I'm not saying that this is all that was necessary to solve Josh's problem, which is a manifestation of a larger problem that I will examine later in this book in greater detail. But we are often blocked precisely because we want and need to accomplish something; our instinctive focus on "doing" brings into play the very habits that interfere with our capacity to learn. As an alternative to our usual modes of trying, we must find out how to transform our responses to the challenge into constructive means by shifting our focus and circumventing these harmful habits. This is when we forget about trying to "do" the right thing and start thinking creatively for our purposes. This is when we begin to learn how to learn.

2. The Problem of Conception

Learning something new always involves thinking in a new way, forming new conceptions about what we are doing and how to do it. Too often, however, we are stuck in our old way of thinking, and this attitude prevents us from thinking in a new way.

Let's look now at this principle as it applies to performing skills—this time to the problem of conception and its central role in learning difficulties. Let's say that a person is having trouble singing without unnecessarily tightening the muscles of the throat. Noticing that the student is using too much tension, the teacher then asks the student to sing a phrase, pointing out particular faults and asking the student to correct them.

What is wrong in this approach is that the teacher is creating a vicious cycle by asking the student to do the very thing that brings about the problem and then to correct what she has done wrong. If the student's idea of how to perform the activity is wrong, what good does it do to have the student repeat that very thing, and then ask her to relax particular muscles or sing differently? The student thinks that to sing she must use tension. Why, then, does the teacher expect to remove the tension while continuing to ask the student to sing? It is the student's very conception of singing that is at fault. Further efforts to sing properly cannot correct the problem. She must be given an alternative to her usual conception of what it means to sing.

By failing to recognize the bind the student is in, the teacher too often fails to discern the true nature of the problem. The teacher thinks there is a right way of doing something, if only he can simply show the student what it is. He thus steps into the student's vicious cycle. If this doesn't work, he concludes that the student has a block or, worse, simply can't master the problem, not realizing that he has contributed to the very situation from which he drew this conclusion.

Indirect Learning

Let me give one more illustration of the problem of conception and its importance to learning, by sharing a personal experience. A number of years ago, I had singing lessons with a voice teacher who pointed out to me during our first lesson that I sang with my throat "closed." Wanting to understand what she meant by this, I asked her to demonstrate how to sing with an open throat (which she did) and then tried it for myself, but to no avail. Over and over, she asked me to sing with an open throat and I tried to do what she asked, but I simply couldn't.

During our third or fourth lesson, my teacher asked me once again to sing with an open throat, this time suggesting that I sing more forcefully and theatrically."

"Oh, you mean that you want me to sing in a pompous style," I suggested. My teacher squinted at me and said, "What do you think it means to sing in a pompous style?"

"Like the lion in *The Wizard of Oz*, or like Pavarotti singing 'O Sole Mio.' "

"Let me hear what you mean," my teacher asked.

I proceeded to sing in what I felt was a pompous operatic style. Once I began, I knew immediately that this was what my teacher had been trying to show me. For many years, I had been singing in a folk and blues style, which tends to be sung with a closed or tight throat. Singing with an "open" throat felt and sounded, to my ear, like I was being pompous and unnatural—the kind of singing you only do when you are exaggerating or making fun of opera singers. To ask me to sing with an open throat, then, was a contradiction in terms, since singing to me was close-throated. To succeed, I had to do an activity that, for all intents and purposes, wasn't singing. Because my idea of singing was limited, I had to do something entirely different than what I thought was singing.

This example clearly demonstrates the problem of conception in learning, and the need to approach a problem indirectly in order to overcome a wrong conception. When my teacher asked me to sing in a new way, I could not, simply because singing was associated

with my old habits. When it finally occurred to both of us to do something that wasn't singing, we made a breakthrough, since the new and correct conception didn't feel like normal singing to me. And the only way to achieve this was by approaching the problem indirectly, by trying out activities that were related to, but didn't feel like, singing. In the process, I had an "aha" experience—the kind that comes from trying something in a completely new way and then realizing that you have made a breakthrough in your understanding of that activity.

Overcoming Fear

Helping a student who is having difficulties, however, is not as easy as it seems. Take the case of a child who is having trouble learning to write. Part of the problem, as in most skills, is that the child will try too hard and use too much muscular effort. But what will happen if you then show the child how to write in a way that requires little effort? He may now have an experience of writing with less effort, but he will be loathe to adopt this new means when he actually has to write, because he doesn't regard this new activity as writing! The child is paradoxically wedded to the very habits that create his difficulties, because those habits give him a feeling of security, a sense that he is trying and doing what is expected of him. But half the problem is contained in that attitude. When we are afraid that we can't do something, we then become obsessed with doing it right. The moment we think in these terms, we engage in the very behaviors that cause the problem.

In a peculiar way, fear of failure thus perpetuates the problem of learning something new by making us fixated on the very attitude that caused the problem in the first place. Particularly when frightened and worried, people will tend to insist on doing the very thing that causes their problem, even though it only aggravates the situation. Unless the teacher intervenes by creating a structure that provides the student with a new avenue or direction, the student continues to flounder. All learners have the potential to overcome their problems, but they tend to sabotage their own efforts.

Making Learning Manageable

We can see from these examples that by doing something related to (and yet different than) the activity we are trying to master, we can often solve a problem. By replacing an unconstructive response or activity with a constructive one, the problem is not corrected so much as circumvented. This is a fundamental principle in good teaching. All teachers who are skilled in observing students who are having difficulties will employ the basic tactic of having the student approach the problem indirectly. If someone is having trouble writing, have them draw; if they are having trouble speaking, have them sing. If they are afraid to try something new, have them play-act the activity, or do a related task that they find less frightening.

It is also useful when students are having difficulties to present problems in manageable stages. If swinging at a thrown ball is difficult, then swing at a stationary one. If playing a piece is too complicated, then learn one phrase at a time. The cellist Yo Yo Ma describes how, when learning the cello, his father had him memorize and master only two measures a day of a Bach Suite, until he had learned the entire piece.[1] This makes it possible to put all one's energies into doing one thing well, rather than many things badly. Divide and conquer: that is the motto we should live by when mastering difficult skills.

Teachers must also be sure that they provide a constructive environment for their students. When given a simple exercise in steps, a music problem can be quite manageable; but give it to the student all at once, and he collapses. The difference is only in our minds; yet a difficult program, taken in stages, is quite manageable, even though we must do it this way in either case. Children and adults alike become bad learners and, what amounts to much the same thing, stop enjoying the process of learning when given too much at once; or else they become completely overwrought and overly ambitious. One of the reasons why young children find learning so easy and joyful is that they have no care for the future. They immerse themselves in the moment. They learn with complete innocence and joy, and therefore learn efficiently. In contrast, we

adults worry about whether we will figure something out or fail. We often tackle problems under the shadow of a larger task or goal that looms over us, and we are therefore afraid to experiment freely. Our teachers often aggravate the problem by giving us whole programs which often reflect their ambition and not our own, until we internalize these ambitions and become our own worst enemies. As a result, we feel overwhelmed, and rarely give ourselves the kind of freedom that children have, or take things in such manageable stages.

As adults, however, we can't expect to learn with the same carefree attitude we had as children. Since a reversion to childhood is out of the question, we need to consciously establish for ourselves precisely those conducive conditions that a teacher or good parent creates when they are helping us to learn: a quiet environment, time to think about what we are doing, and a break-down of the process into manageable pieces that make it possible to learn in stages. Take some time to think about what you want to do, arrive at a program that is divided into stages, and then choose the first simple step. "Today," I say to myself, "I will focus on learning two phrases of that difficult piece of music, and that's all. Never mind about tomorrow; I know what I have to do today." The total problem may be no different than before, but we have conceived it differently, and this makes it possible to approach it with a lighter heart. Instead of viewing the problem or learning difficulty as a barrier or overwhelming challenge, we present it to ourselves in a way we can manage. We take charge of the learning process by taking charge of how we conceive what we have to do.

When we have learned how to present problems to ourselves in a manageable way, we have learned how to learn. We have internalized the teacher, so that we know how to talk to ourselves, how to be kind to ourselves, how to use constructive strategies that enable us to respond to our own negative attitudes and harmful exertion—in short, we have created an environment conducive to our own learning.

3. Experimenting

All learning involves experimentation, or "trying" things out. No one starts out knowing how to hit a ball, how to play an instrument, or how to ski. We learn by trying, and by trying we find out what we can do. For most of us, though, trying means just that: trying to get something right. We have all watched a young child at bat while she tries to hit the ball, swinging for all she's worth. The child is so consumed with hitting the ball that she hardly cares about anything else. If she fails, she becomes upset, which only makes her try harder. She isn't experimenting; she is just plain trying too hard.

If we are fortunate, we get one or two teachers during our school years who help us approach skills more intelligently. If they see we're having a problem, they give us something indirect to work on that they think will help us to understand the skill. It is much easier, for instance, to hit a stationary ball than a moving one. Simplifying the task in this way enables the child to learn in manageable steps, but it also gives her a chance to experiment because it diverts her attention from trying and gets her to focus more constructively on the process of coordinating her swing with where the ball is. It transforms a negative and frustrating experience into a positive one, since she now has a manageable challenge in front of her. It gives her a chance to learn through experimentation.

How many of us, when playing a sport or learning an instrument, can say that we practice in this way or provide ourselves with a truly constructive environment? Most of us, when working at a skill, have the idea of practicing—that is, doing something over and over to perfect certain motions. We may, for periods of time, focus on one particular problem or another. But we rarely give ourselves the opportunity to experiment, to take the time to come up with new ways of approaching activities we find difficult. Even when we know we should break the skill down, we feel that to do so is to

concede weakness, since we ought to be able to perform without resorting to special simplified techniques. Intellectually we embrace such values as the need to stop and think about what we are doing, to focus on process rather than product, and to put aside our egos in the process of learning and trying new things. But we often continue to work blindly, hoping and determining to get it right. Sometimes, not wanting to look like beginners, we refuse to experiment for even a few minutes—even if this might improve a tennis stroke that has been faulty for twenty years.

The process of experimentation allows us to expand our understanding. When we swing a bat, we think the problem is to hit the ball, and all our efforts are focused in that one direction. But when we experiment, we discover that our attention must first be focused on watching the ball and on the process of swinging in a coordinated way; hitting the ball occurs as a consequence of this focus.

Experimenting means that we must give ourselves the freedom to be wrong. Even when we recognize that we must give ourselves new ways of looking at a problem, our desire to be right may still get in the way. For many pianists, simply giving oneself permission to hit the wrong notes, or even to play the wrong notes deliberately, represents a huge leap into the unknown, so great is the fear of hitting the wrong notes and so powerful the urge to always hit the right ones. Yet such a step is truly liberating to a musician who has never given himself permission to be wrong.

Strategies for Failure

Failure is to a large extent a learned behavior. Many of us, when trying to learn something we have always found difficult, harbor a secret conviction that we cannot learn and are therefore half-hearted in our attempts. When we fail, we are secretly satisfied that we have proven ourselves right.

One way of doing this is simply to deny ourselves the opportunity to try something new. Instead of giving ourselves a genuine opportunity to employ new procedures under controlled

circumstances, we place ourselves in the old and familiar situation, hoping that we may be able to overcome our difficulty but remaining secretly convinced that it won't work. When, after a few minutes, we fail, we believe we have succeeded in proving that we are indeed incapable of success. Sometimes we do not even make this half-hearted attempt, but simply fail to try anything new and, when asked later if we have tried, actually convince ourselves that we indeed made a real effort when in fact we never did.

Another version of this strategy is to set ourselves up for failure by changing the rules of the game in midstream. Years ago, I had a student who impressed me with how engaged she was in learning. She worked hard; she asked lots of questions; she insisted on challenging herself continually. Yet time after time, she seemed to collapse after twenty minutes or so, ending up dissatisfied and frustrated. Was it some fault in my teaching? Did she have a learning disability, or was there some underlying problem that I had not recognized?

One day, I watched closely as she started on an exercise I had given her. After working at it for several minutes, she decided to try something else. She soon became distracted and began to work on a third problem. At the end of this process, she declared that the exercise wasn't working and announced that she was going to give up.

I now understood why she was continually struggling. When given a problem to work on, some people are so anxious to progress that they do not stick with the problem but decide, midstream, to go to the next level or to add another problem to the day's exercise. The result is that, instead of having a good experience, they lose track of the problem they are working on and end up feeling confused and dissatisfied. Even though she may have accomplished the goal she initially set for herself, my student's attempts at learning backfired because, by creating new goals for herself midstream, she eventually took on a problem she couldn't handle, and so ended up frustrated. Many of us fail in just this way by taking on more and more and, in the process of working at loose ends, denying ourselves a sense of accomplishment.

Another strategy for failure is negativity and learned helplessness. When asked to learn something new, some people respond by frowning and stating that they do not understand what is being asked of them. The sympathetic teacher will reassure the student, engaging in a discussion with him about why he feels resistant or is struggling with the task. Yet no matter how much the teacher tries to plumb the source of the difficulty, the student continues to struggle, and the teacher tries again and again to explain.

The real problem in this case is that the student has learned to behave in a way that makes it impossible for him to learn. The teacher feels a need to address the content of the student's complaint; the real problem is the act of complaining itself. This is a particularly pernicious problem because the student's behavior tends to elicit sympathy from the teacher and is thus designed to distract the teacher from the behavior itself. This sympathy, however, is not what the student needs, since it feeds his sense that he is stupid or has difficulties. It takes a certain degree of experience on the teacher's part to understand that, even though the student may have emotional difficulties, his attitude is actually a learned behavior; when the student is broken of his harmful habit, his fears and difficulties will dissipate. The irony here is that although the student will do his best to drag the teacher into his problem by eliciting sympathy, in the end he will be most grateful to, and have the most respect for, the teacher who takes charge of the situation and refuses to indulge him in his harmful behavior.

4. Intelligent Learning

It is natural, when taking up a new skill, to want to confront the most challenging problems. No one who takes up piano wants to work on scales or trills or, even worse, to study the notes on the page before actually sitting down at the instrument. We are motivated to play because we have heard beautiful pieces beautifully played, and we want to do the same. Accordingly, we tend to take on difficult challenges and, even when we are unable to perform the piece we have chosen, constantly try it out to see if we can get it right.

Such an approach, however, is spurious as the basis for real learning. Many years ago I used to teach rock climbing, and this pattern of teaching by presenting the learner with the hardest possible climbs was typical of how climbing was taught. Most beginners, on their very first outing, were challenged to climb a fairly difficult rock face with the idea that, if they succeeded, they would build confidence and simultaneously experience the satisfaction of overcoming a seemingly insurmountable challenge. This approach was then continued in the form of tackling more and more difficult climbs in the hope that the climber would become stronger, more capable, and more skilled.

This approach, however, rarely provides us with the elements most conducive to learning. After making a number of difficult climbs, what has the student really learned? As I said, he has the satisfaction of having accomplished the feat. He has also perhaps demonstrated that he is somewhat athletic, or at least determined. But there is little that is really gratifying in the experience; in the process of achieving the immediate goal, he has learned little about himself, little about the sport, and perhaps already started to acquire bad habits.

Let’s say that, instead, the novice is shown a simple movement on the rock—say, how to step up onto and balance on a simple

foothold. He tries the move; he cannot succeed. He tries again and more or less succeeds, but this time, he realizes he is straining by pulling back his head, arching his back, and straining for the handholds. In the process of using so much effort, he is achieving his goal, but at the expense of his balance and stamina. The teacher asks him whether it is possible simply to balance on the foothold without using his arms and straining. After a few more tries, the student finds that his balance improves, and he is able to step up onto the hold without effort. The experience is gratifying; the student has learned how to balance better, and how to do the action, not by increasing effort but by decreasing it. He has focused on the process of climbing—the *how*—and indirectly ended up being able to climb more skillfully—the *what*. What's more, he has had the satisfaction of seeing *how* he learns. He has had a complete experience, an experience which, as all who do something well know, is aesthetic in nature and involves appreciation and love for what he is doing, joy in the movement and a sense that his true obstacles lie within and that the real challenge of gaining mastery is the internal process of self-discovery. He has had the rewards of increased self-mastery and understanding, not just external accomplishment.

This example illustrates a fundamental principle in learning skills. By breaking a skill down into manageable components, we don't just isolate our abilities and learn more efficiently; we also discover the true problem that requires our attention. By focusing on a single problem, we are forced to learn something about ourselves, and in the process we accomplish not simply an external feat, but improve our style and control.

John Dewey's concept of "doing and undergoing" is one of the best expressions of this idea of focusing on process and learning through experimentation. Learning, Dewey said, isn't just a matter of drilling ideas into someone's head or, in this case, accomplishing a rote feat, but a process of trying and undergoing. By doing something, you then undergo or suffer an experience, and in the process, you learn.[2] When we isolate a problem and give ourselves

time to evaluate the results, the experience transforms us and teaches us something. We try, and in the trying, we learn.

The opposite happens when we attack problems with drilling and brute force. Instead of giving ourselves an opportunity to have a learning experience, we short-circuit the educational process. In the end, we gain little from the effort. This was my own experience in high school and college when, after five or six years of running and climbing, I felt I had little to show for it except some external successes. Deep down, I knew that my accomplishments were not won with any real style, and they gave me little lasting satisfaction. Mostly, I had failed at what I knew I was really capable of. Even if we succeed in external accomplishments, we have not mastered anything by means of which further learning can take place; we have not gained any wisdom or understanding. Real learning, in contrast, involves a constant process of patiently experimenting, of gaining insight into the process of achieving ends through increased self-awareness. At the most fundamental level, this type of learning is aesthetic and embodies a complete experience.

Yet how many of us learn this way? We try and try, glossing over technique and basics. Instead of consciously embracing the idea that we are beginners, we try to show how much we know as opposed to finding out what we don't know. Worse yet, we convince ourselves that by mechanically going through the motions we are progressing when in fact we are simply practicing our bad habits. External achievement is not the true sign of progress, since we can overcome obstacles and reach new goals without really increasing in intelligence, awareness, or improved performance.

In contrast, when we learn intelligently, each step gives us a sense of real enjoyment and becomes an educational experience in its own right. We discover that learning is experiential, that we aren't imposing something but undergoing an experience—evaluating, reforming, rethinking. Ultimately this process leads to greater control and an enhanced sense of appreciation, humility, and self-knowledge. In short, it leads to internal development, insight, and even the building of character.

5. Structure and Discipline

Learning to approach skill intelligently requires structure and discipline. We have all been impressed by stories of musicians who practice seven hours a day, aspiring to become the next legendary virtuoso. But discipline involves much more than persistence. Heifetz, the famous violinist, said that he could not have progressed if he had practiced six hours a day; he practiced no more than three hours with constant breaks.[3] His goal was not to practice repetitiously but intelligently.

Knowing how to practice intelligently is an art in itself. Most piano students can't wait to get their hands on the keyboard. If you suggest that they practice by actually staying away from the piano, they will probably object and sometimes even resent the suggestion. But to practice intelligently means, first and foremost, to refrain from blindly trying and instead to approach problems thoughtfully, finding clever and novel ways of doing things.

Long-Term Commitment

At the highest level of attainment, the skilled practitioner, having mastered the technical aspects of his art, practices by sitting and doing nothing, waiting for the moment when action will occur of its own accord, motivated not by the desire to succeed but by clarity of intention. Knowing how to achieve this is an art in itself, requiring maturity, patience, and commitment to an ideal that does not yield immediate results. One of the attributes that makes us so distinctly human is our capacity for engaging in activities that are not instinctive, blind, or aimed at immediate ends. A dog carrying a stick will bump repeatedly into a door frame if he wants to enter a house, so focused is he on his immediate end. In contrast, we humans are capable of working for years at a particular skill with the hope that, in ten or twenty years, we may finally achieve

mastery. When we make such a choice, we subordinate many immediate pleasures to this long-term goal. This is a remarkably human capacity, and it arises from the value we place on our art, an ideal, or some other long-term goal.

This capacity lies at the heart of mastery and implies several qualities that are crucial to an intelligent approach to skill. Skill requires the subordination of blind doing to disciplined, indirect procedures aimed at developing a range of potentialities. It requires the imposition by the teacher of a hierarchy of attainments that must be worked at systematically. And it requires the commitment to work each day toward a distant goal that sometimes is not even understood by the student. It is the teacher's job to provide the structure necessary for intelligent practice; it is the student's job to internalize this discipline and to become his own teacher.

6. Learning Problems

Let us examine one final aspect of learning—namely, the relation of learning problems to emotional difficulties. Many years ago, when I first started to teach professionally, a friend of mine told me that she had just been given a new car but confessed that she did not know how to drive. When I offered to show her, she insisted that she was "unable" to learn; she explained that a number of people had tried to teach her, but each time she got behind the wheel, she was simply too scared to learn. After six failed attempts she had given up.

Without hearing more details, I knew that my friend wasn't suffering from a phobia so much as bad teaching. Each and every time she had tried to drive, her well-meaning teachers had asked her to learn in traffic—a method that in her case could have only one outcome. Too many times I had observed well-meaning teachers and friends teach in just such a way by asking a child to hit a baseball, or an adult to learn to drive, by placing the learner in the very situation that provoked the highest level of anxiety. This is a well-intentioned but amateurish way to teach an apprehensive student. I knew that simply by teaching my friend to drive in an empty parking lot, I could give her a much better start, because there she could focus entirely on learning to handle the car without the added stress of dealing with traffic. She was willing to go along, and in one hour she was driving comfortably around the parking lot; in another hour she was driving on the street without undue anxiety and perfectly in control.

I mention this example (which I will examine in more detail later) because it's easy to assume, observing the driver when she is panicking at the wheel, that she suffers from an emotional disturbance or phobia and that the first requirement in helping her is to examine or treat the phobia. But emotions were not the primary cause of her problem. When a learner has suffered from

constant failure, she naturally experiences a loss of confidence and eventually becomes apprehensive when asked to perform. Sometimes these negative emotions do develop into an outright phobia, a kind of morbid dread or panic when confronted with the challenge of performing. But my friend's problem was a learning difficulty, not an emotional disturbance; as such it required the knowledge of a teacher, not a psychologist. By studying her emotional attitudes, she might gain some insight into the nature of her fear and prior experiences that may have contributed to the fear. She might also learn techniques for controlling the fear when she gets behind the wheel.

But none of these techniques could teach her how to drive, or provide the proper environment within which she could learn and acquire true confidence in her ability. She could do this only by actually getting behind the wheel of a car with the help, not of a psychologist, but of a teacher who could properly structure the situation.

Many of the problems we are examining in this book, then, are essentially learning problems with an emotional component, not emotional problems that affect learning. In recent decades, introspective theories of psychology have become so dominant that we automatically tend to assume that learning problems are symptomatic of underlying emotional issues. But the driver's problem has no emotional cause as commonly understood; it is nothing more than the failure to learn itself that has become emotionally charged. Figuring out why the driver is scared, trying to deconstruct the fear, and providing a compassionate ear may demonstrate sensitivity and concern for the learner, but it won't solve the problem. Knowing how to create a situation in which the learner does not conceptually associate with the thing that is feared —coupled, of course, with positive learning experiences—is the key to the problem; this will indirectly dissipate the emotional energy connected with previous failure.

There are, of course, many situations where bad performance in school can be traced to emotional difficulties and challenging family circumstances. But I am convinced that the sort of problem we

observed in the driver—which is pandemic in children—is caused not by emotional disturbance but simple failure to learn based on poor and even deleterious teaching. The most destructive force in education is ignorance in teaching, which leaves children at the mercy of their failures. When teachers are unable to recognize this pattern, learning becomes a source of constant failure, undermining the child's ability to handle new situations. When this situation is corrected and the child is able to learn freely and to gain the true confidence that comes from acquiring skill, the emotional attitudes associated with failure cease to have any force.

Unfortunately, many parents today tend to sentimentalize the difficulties they had growing up and project these attitudes onto their children. In so doing they end up providing their children with plenty of emotional support, but not more intelligence in teaching. Children need love and support, but they also need structured learning environments and the discipline necessary to learn properly.

One of the main reasons for this oversight is our failure to understand mastering skills as a positive subject. Parents want their kids to learn and succeed, but they rarely treat skills with the same level of respect that they give to intellectual abilities. In reality, the acquisition of motor skills implies the realization of our potential just as much as the overtly cognitive skills of reading and doing math.

Diagnosing the Hidden Problem

Being able to recognize when a child is having trouble learning represents a crucial but unacknowledged diagnostic category in education today. In his book *How Children Fail*,[4] John Holt brought attention to the crippling fear that grips many children in the classroom when questioned by the teacher or asked to solve problems. Many of us recognize from our own childhood how fearful we were of making mistakes in the classroom; Holt gave voice to this problem. Many children also suffer in learning basic musical and athletic skills, but we neglect to take the problem

seriously in part because we don't take the process of learning skills seriously. When observing children engaged in sports or performing music, we tend to be so busy judging their performance that we forget to question the legitimacy of the methods being used to teach them. Many children and even adults are simply scared when faced with learning new skills. The idea of being right has been so deeply drilled into us that we're rendered virtually incapable, when taking on new challenges, of learning in an intelligent manner. We're generally forced to respond by trying harder, so that we continue to fail and never truly realize our full potential. Only when we are given a chance to learn within a structured environment that allows us to benefit fully from the process of experimentation can we expect to break the cycle of trying and begin to apply intelligence to learning.

CHAPTER TWO

The Elements of Skill

1. Reflex versus Voluntary Aspect of Skill

As I've said, our main preoccupation in learning a skill—and the assumption that this book aims to challenge—is that skills consist of positive abilities, actions we must actively learn to make. Accordingly, when we attempt to master an unfamiliar skill, we tend to focus entirely on the particulars of the task at hand, on doing the right thing. We've already begun to see why this is a fallacy; let us now look at what skills *do* consist of.

Let us begin with the most basic attribute of skill—namely, the reflex component. If asked, many of us would say that the hallmark of skill is the ability to perform the most difficult actions—the most challenging passages in the piano repertoire, the most difficult jumps in ballet. But in any given field, the most difficult elements can be performed by any number of people; those to whom we would attribute the highest level of skill are those who can do these things easily. Someone who does something very well—a great singer, or martial artist, or pianist—seems to do it almost casually, as if it is happening by itself. This is because most skills are comprised of basic movements that occur naturally and automatically, and much of what we call talent is the process of

removing the impediments to these natural and automatic elements in movement. When the performer has attained this level of effortless grace, he has mastered his art, and we admire the performance as we would a work of art. Effortlessness, not virtuosity, is the hallmark of skill.

To illustrate this reflex component of skill, let's look at the simple act of walking by observing a typical person taking a few steps. The most noticeable movement most people will make when walking is to draw the hips to one side in order to shift the weight (Fig. 1). When the weight is over one leg, the other leg is advanced to take a step. The weight is then shifted over the forward leg so that the other leg can now advance, and so on—the entire process resulting in walking.

Consider what happens if, in contrast, you ask the subject to incline forward from the ankles while resisting the tendency to take a step. If he is successful in this, the body will now pivot forward and, by simply allowing a knee to release forward, our subject is able to easily step forward, without having tried to walk or even to move. The result is a graceful, effortless series of steps that occur not by trying to move the legs, but simply by allowing the body to incline forward in space and allowing the leg movements to accommodate the forward movement of the body (Fig. 2).

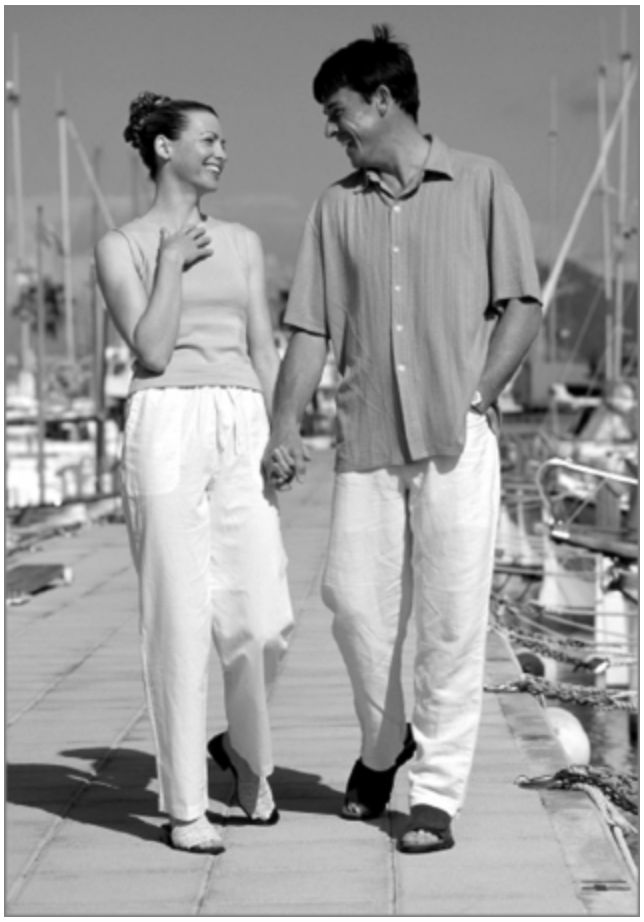

Fig. 1. *Man and woman walking in a way that interferes with natural supporting reflexes. Notice in particular how the woman draws her hip forward and sinks into her supporting leg.*

Notice that to produce this action, no deliberate movement or tension in the legs was required; it wasn't really necessary to take a step so much as to let it happen. That's because walking, although we think of it as a voluntary activity, is mainly reflexive, or automatic. With age, we tend to interfere with these natural reflexes, so that walking, like other everyday actions such as rising from a sitting position or bending to pick something up, becomes awkward and labored. The action itself, however, is meant to occur easily and effortlessly, the volitional component being involved only insofar as it may be required to alter the movement slightly or to choose a different movement entirely. The basic movements that occur in walking are, like those of an infant, largely reflexive; what

we call volition is the capacity to choose to walk, not the act of walking itself.

When taking a step, then, the body has to sustain a kind of background muscle activity in order for that specific movement to take place. If you flex the arm at the elbow, you are likely to be aware precisely of the activity of muscles involved most directly in that action—in this case, the tensing of the biceps. But even so simple an action as flexing the arm is deceptively complex. In order to perform such a movement, the entire shoulder must be stabilized by muscles that connect to the back and torso, which are in turn connected with muscles that support the body in standing or sitting. In other words, specific muscles such as the biceps always work in the context of the total network of postural support. Basic body posture is the background against which all specific, deliberate action occurs.

Fig. 2. *Woman walking and carrying weight without interfering with supporting reflexes*.

This automatic component in action illustrates a fundamental principle of skilled activity—namely, the underlying presence of automatic or reflexive actions. If you ask most people to describe the actions necessary to walking, the first movements to be noticed will be the action of the legs and the hips. But the most basic aspect of walking—and the one that receives the least attention—is the act of standing erect, the fact of uprightness itself. Standing is an automatic process; we do not have to think about how to do it, or make any deliberate effort to maintain our balance. By simply standing, allowing the body to pivot forward slightly at the ankles, and then allowing a knee to release so that the leg can advance under the body, walking, too, takes place with little deliberate effort. You have made no willful movement, yet the action occurs completely naturally, simply because the body, which is able to support itself against gravity, holds the potential to release into movement when this is allowed to happen. When seen in this way, the action of walking requires not so much a series of active movements as an unimpeded activity of underlying reflexes combined with a simple decision to allow the activity to begin—all of the subsequent movements taking place, if you let them, completely by themselves.

As with many bodily movements, then, the correct action in walking is achieved first of all by eliminating the interfering habits, which allows the natural supporting muscles to reflexively operate; secondly, by figuring out how to initiate walking without interfering with these reflexes. The execution of the correct act doesn't require the superimposition of deliberate actions over the reflex operations, but is simply a variation of the reflex component, achieved largely (in this case) through clear thinking.

Effortlessness in Action

How does this principle apply to complex performing skills such as playing the piano or singing? It might be argued that while such a

simple action as walking does not require “doing” of any special kind, skilled movement is more complicated and therefore does require special knowledge of what to “do.” But singing, complex martial arts movements, or playing piano, while they involve a certain degree of deliberate effort, are nevertheless comprised of a series of reflexive movements no less than walking or standing. What makes these skills complex, in fact, is not the addition of deliberate action, but the ability to conceive of complex movements and to coordinate them one after the other while not interfering with the natural reflexive functions upon which the specific actions are based. This results in fluid, skilled movement. Conversely, when complex movements are performed in such a way that the underlying reflexes are interfered with, then we no longer regard them as having been performed skillfully. The execution of complex movement, in other words, is not superimposed on the reflex activity, but is rather a kind of refinement or variation of natural or reflex actions.

This means that, instead of being separate from total body movements, specific movements are in fact broken down from them, and in this sense are not additive but deductive from the larger whole. The act of writing may seem to involve various specific movements, especially when we are deliberately shown how to hold the pen or to form letters. But when we use tongue and neck muscles to control the movements of the pen, we are exhibiting a lack of mastery because we haven’t properly inhibited the larger and unnecessary movements involved in this highly refined task. Again, the specific, fine motor activity of writing is in fact part of a total pattern that must involve inhibition of unwanted movements; the total pattern is the most basic aspect of the specific movement.

This explains why, when you are able to keep all unnecessary body parts perfectly relaxed during these activities, you have achieved a high level of mastery—again demonstrating that economy of effort, not virtuosity, is the *sine qua non* of skilled performance. To illustrate this principle as it applies to skilled activity, take the case of singing. Many inexperienced singers, when preparing to sing a long phrase or to hit a high note, begin by taking

a breath and increasing the overall effort; this has the effect of interfering with the innate reflexes upon which the natural sung tone is based. But what makes it possible to sing the complex phrase or to hit the high note is not simply the ability to perform specific vocal feats, but to meet such challenges while not interfering with the natural processes basic to all sung tones.

Pavarotti, the famous tenor, exemplifies this effortless quality in video recordings of his singing. Before he begins to sing, he makes no preparatory movement of any kind. All of a sudden, his jaw opens and a sound emerges, with little indication that he has had to make any physical effort or draw breath between phrases. If you view his performance with the volume turned down, it is virtually impossible to tell when he is singing and when he is pausing between vocal passages, except for the movement of his jaw. Singing requires tremendous athleticism; yet Pavarotti's mastery is such that, in order to sing, he appears to be doing nothing at all. He is able to bring his vocal mechanism into play without interfering with the natural reflexes on which singing is based.

Heifetz, the famous violinist, exemplifies the same quality of effortlessness. In documentary footage of his playing, he comes onto stage, standing almost immobile. When he is about to play, he raises his violin, places it under his chin, and then performs the piece, hardly moving any part of his body except for his fingers and bow arm. When he is finished, he drops his arm, having moved his body almost not at all during the entire process. It is a perfect demonstration of non-doing and economy of effort (Fig. 3).

This natural process, as we will see later when we discuss breathing and vocalizing in depth, is a basic reflex activity which is usually operative in infants but which, in many adults, is increasingly lost. The challenge for most singers is not so much to master complex vocal feats as to restore these reflex elements so that singing can take place naturally. In even the most complex actions, it is the underlying reflex element that is paramount. One must first discover the automatic components of producing sound as the basis for subsequently exploring the full range of the singer's art.

Fig. 3. *Jascha Heifetz playing while remaining completely relaxed throughout his body*.

There are two elements, then, in any skilled action: the reflex or automatic component, and the voluntary. Voluntary action is the most closely associated with learning, since it represents that aspect of skilled action that must be deliberately studied and executed. Yet however deliberate or complex the skill, voluntary action is necessarily comprised of automatic components of which we are largely unconscious. In a highly skilled singer, the sung tone—even to the singer himself—seems to happen of its own accord. We would have to describe the act as voluntary; yet the action is in large part the outcome of natural reflexes. In any skilled action, in other words, the voluntary component is built upon a foundation of reflex activity. This means that not all learning should be focused on what we must positively do to make something happen. Much of the

singer's training consists in learning *not* to interfere with these natural reflexes while singing difficult passages. Learning involves what we must *not* do as well as what we must.

2. The Receptive Elements in Skill

Perception

Having now looked at some of the stumbling blocks in the way of learning, as well as the basic reflex and voluntary elements of motor skill, let us look now at some of the fundamental psychological components of skill. All of us have at one time or another envied the ability of the skilled athlete to perform a difficult maneuver that we find impossible. When we attempt to learn these apparently impossible feats, we conclude that we haven't yet figured out what to do, and continue trying to reproduce the action, with little success.

But skilled actions aren't simply a "thing," an action that we must somehow learn to reproduce. They result from a number of perceptual and receptive components that must be coordinated with overt actions to produce the completed movement. Take as an example the act of hitting a forehand in tennis. A player who is able to hit well knows how to swing the racket in a coordinated manner; it is this action that we try to reproduce when we want to learn to hit a good forehand. But hitting the ball requires the ability not just to move the racket a certain way, but to see where the ball is, to adjust our movements to the trajectory of the ball, and to "feel" the ball when it hits the racket—all of these elements comprising the total act of hitting a forehand.

The same is true with the act of catching a ball. Toss a ball at someone who is not very adept at hand-eye activities, and they will deliberately grab at the ball, often dropping it because they are not sufficiently sensitive to where the ball is and to receiving it in the hand. They conceive the activity as something to *do*. But anyone who is adept at this activity knows that catching a ball doesn't require deliberate action so much as a kind of sensitivity to where the ball is, and the ability to adjust one's movements accordingly.

Catching the ball then becomes an effortless, casual gesture, a kind of simple accommodation to the trajectory of the ball.

Skilled actions, then, are often skilled not by virtue of what we *do* to make them happen, but by virtue of adjustments that we make in response to our perceptions. Both hitting a tennis ball with a racket and catching a ball in one's hand require the ability to monitor what the ball is doing and to respond accordingly. Each act possesses a receptive component that is essential to its proper execution.

In order to experience this receptive element in skill, try this experiment. Have someone throw a ball toward you several times in a row. Imagine that there is an invisible wall, or plane, just in front of your body and, watching the trajectory of the ball, notice at what point it passes through this invisible plane. The next time the ball is thrown toward you, place your open hand at the point where the ball is about to pass through this plane, so that your hand blocks its path of motion. Do not try to catch the ball; simply block it and allow it to hit your palm. Try this several times until you become adept at it. Now try it once more, and this time, think of your palm being soft and yielding so that, when the ball hits your hand, you can "feel" or cradle it in your palm. Without "doing" anything, you have placed your hand in the path of the ball and, simply by focusing on these receptive elements (watching the path of the ball, responding to where it is by moving your hand, and "feeling" the ball in your palm), you can catch the ball easily. If you try this experiment with someone who is unskilled at catching a ball, they will become quite adept and coordinated simply by putting this into practice. They will have learned that catching a ball is about responsiveness, not about doing something.

This isn't to say that there are no active elements in catching a ball, or that all skills are of this sort. In catching a ball, and certainly in throwing a ball or swinging a tennis racket, there is a distinctly active component, an action that must be energetically performed. But the distinctive quality in this action of catching a ball is not so much what we have done, but how little needs to be done if we know how to respond efficiently—that is, if we are sufficiently receptive rather than overactive in our response to the ball.

As a preliminary statement, then, we can say that every act has a receptive and an active element. The receptive element, in this case, is largely visual and tactile; the active element is the movement itself. But the two work together—the movement, in both cases, being a response to what one sees.

To consider a final example, sit at a table and place a glass in front of you; then reach for the glass. Are you able to do this because you have previously learned this action, which you are now only repeating? If that were so, you would have to account for each action you make by supposing that it would be necessary to learn a particular action for each case, and of course that would be absurd. It would also be absurd to suppose that, by trying over and over, you finally hit on the right movement. It would be far more accurate to say that you move your arm, and then adjust its movement based on visual input telling you whether the movement is accurate.

A simple act, then, is not a matter of doing the right thing, but a learned coordination which begins with an active exploration or reaching into space, and then an adjustment or response to the environment based on visual or tactile perception. You don't *do* the right thing; rather, you move into space, and then your eye, or your sense of touch, mediates that movement. This adjustment in fact goes on every time we pick something up—it's just that we've gotten so good at it that it occurs almost imperceptibly and instantaneously.

It is important to note that, as infants, we are not actually able to grasp objects and have to *learn* how to coordinate our movements, our eye, and the tactile and prehensile capacity of the hand in such a way that we are able to reach out to an object and grasp it. At this developmental level, we are unable even to understand that an object is separate from ourselves, and that we are capable of reaching for it and grasping it—in other words, we have not sufficiently constructed our reality to be able to properly conceive of deliberate action that results in mastery over our environment. Motor activity and sensory input must be coordinated to the point where we have cognitively constructed our world and are able to perform deliberate actions. But once that capacity is

developmentally acquired, we then become capable of performing this action at will, and to coordinate incoming data with the deliberate motor act of grasping an object.

Attention

We've seen that when we try to define or teach skill, we tend to focus on overt movements such as hitting the right notes on a musical instrument or swinging the baseball bat. But skill involves receptive components such as the ability to think clearly about what we want to play or to monitor the ball and to adjust our actions accordingly. To do this, what is of course required is attention.

In our earlier example of the driver, for instance, the key to learning is knowing how to attend to the right elements. It is true that in acquiring the skill of driving, we must learn how to steer the car, to accelerate and to brake the vehicle by becoming sensitive with our feet, and so on; but these elements are mastered in the process of trying out these various actions and observing the results. The same is true of driving in traffic. Inexperienced drivers are intimidated by the traffic around them, and tend to react too quickly by wanting to make sudden movements; but the skilled driver does very little while remaining aware of what is going on around him—in other words, he is attentive to the right elements. The teacher's job, accordingly, is to get the student to focus not on what he must *do*, but on what to attend to. In fact, teaching pedagogy in general should be largely concerned with highlighting the correct elements that require attention, and with getting students to focus away from distracting stimuli such as the preoccupation with performing actions correctly.

Hitting a baseball is another case in point. The first requirement in hitting a ball is not to swing the bat well, but to see the ball. If you forget to see the ball while swinging, you won't succeed however well you swing the bat, which is what so often happens with young children (and sometimes even experienced players) who try so hard to hit the ball that they forget to keep tracking it as they swing. They then respond to their failure by trying even harder,

resulting in even worse failure. A good hitter, in contrast, is able to swing with tremendous power but not have it disturb the monitoring of the ball, as in the case of the legendary Ted Williams, who was reputed to be able to see the stitching on the ball as it approached the plate. The first requirement of all skilled activity is to be able to monitor one's actions in relation to the stimulus; everything else that follows must not disturb that.

To take another example, consider what is involved in running down a crowded avenue during rush hour. In order to dodge the pedestrians and negotiate the traffic, the legs and feet must be moved in a remarkably complex manner. Nevertheless, you don't have to think about where the feet should go, or try to place them; you simply attend to what is in your way—the people, the curb, the bump in the sidewalk—and the feet move of their own accord. Because the body takes care of the details, you need only monitor the environmental elements to which the feet must respond. It is true that, if you lack agility or are inebriated and cannot coordinate your movements, no amount of attention will ensure that you will successfully dodge the crowd. But assuming these elements are intact, attention is the key—and in fact the only—ingredient necessary to performing the activity in a coordinated manner. The issue isn't what to do, but what to *attend* to.

In many cases, attention is not merely a crucial element in learning, but the summit of achievement. In the Zen tale of a famed samurai swordsman, a young man went to the mountains to learn swordsmanship from an old master. For a full year he performed chores, without once being shown how to handle a sword. Just as the young man began to suspect his teacher of taking advantage of him, the teacher began attacking him with a bamboo stick while he performed his chores, saying that he was not ready to learn swordsmanship if he could not even dodge a stick. Slighted by the criticism, the student resolved not to be caught off guard, and from then on tried to avoid his teacher's attacks. Day and night the teacher stealthily crept up on his student to see if he could catch him unawares, until after several more years, the young man was able to remain aware of his teacher's approach, even while asleep.

One day while the student was stirring a pot of vegetables and rice, the teacher struck from behind. The young man snatched up the pot lid and fended off the teacher's blow, then calmly returned to his cooking without even pausing in his task. That evening, the teacher presented the young man with a sword, saying he now knew everything he needed to know about swordsmanship. He had attained the highest art of the swordsman, the state of awareness or *zanshin*, without ever having handled a sword.[1]

Such feats of attention require years of conscious effort, but not all forms of attention must be learned. Animals in the wild are instinctively wary of predators, and young children, whose attention is highly mobile, have a natural awareness of their surroundings and a marvelous eye for detail. In his *Principles of Psychology*, William James comments that because children are so often distracted by whatever happens to catch their notice, one of the primary tasks of the teacher is to overcome this tendency for the mind to wander.[2] It is also important to remember, though, that infants are normally born with a highly developed capacity for sustained attention to objects that interest them, and this kind of attention is often *lost*, not gained, through education. I once observed my eight-month-old niece spend literally three or four minutes at a time trying to screw the cap onto a soda bottle, with absolute focus of attention on what she was doing. This focused attention to an object of interest, known as *depth* of attention, is perfectly instinctive and unlearned in its operation, and although it is not sufficient for mastering high-level performing skills, it nevertheless forms the crucial foundation for all subsequent learning and motivation.[3]

The kind of attention that is not acquired but must be learned is *width* of attention—that is, attention to the relation among things.[4] Depth of attention is one-track, as in the famous story of Archimedes, who was so absorbed in his mathematical calculations that he was not aware of the storming of Syracuse until he was himself attacked. Width of attention, in contrast, refers to a broad awareness of one's surroundings, which includes several things at once. This is the kind of attention that was required of the student of swordsmanship, whose preoccupation with what he was doing, or

depth of attention, made him unaware of his teacher quietly sneaking up on him from behind, and who needed to learn to be aware of what was happening around him *while* attending to what he was doing. It is also the kind of attention required of a jazz musician who, while playing a solo or accompanying another musician, must also listen to his fellow musicians; also of the basketball player, who must be aware of where his teammates are so that, when about to make a difficult shot, he can see if someone else is better positioned to score and pass the ball to him at the last moment. All highly skilled activity has this element of readiness and poise: when something unexpected happens, one is able to respond flexibly without loss of poise.

Width of attention also enables one to think ahead while performing complex tasks. A skilled pianist, for instance, can glance at a line of music and start playing it, while reading ahead to the next section. In this case, his ability to play difficult passages has become "programmed in," so that he can automatically "run off" a complex passage while reading ahead to the next passage. Martial artists aim at a similar skill by performing complex movements until they become perfectly instinctive, which enables them to respond automatically to one opponent with a complex series of moves while anticipating attacks from another opponent. The attention is thus freed from the task at hand, and so allows the skilled martial artist to flexibly respond to new and unexpected stimuli.

Eye-Hand Coordination

Let us now look at a slightly more complicated example than that of reaching for a stationary object. This time, instead of leaving the glass where it is, ask someone to slide it along the table, and try to catch it before it falls over the edge. As before, grasping the glass isn't simply a matter of doing the right thing. Your eye must coordinate the movement of your arm and hand, which must again adjust to visual input. In this case, however, the process is far more complex, for two reasons. First, you must track the object while it moves. This is of course far more involved than observing a

stationary object, which you can pick up once you've located it, even with your eyes closed. Secondly, you must coordinate the movement of the arm with the eye, but in an extremely short span of time. In picking up a stationary object, you of course have as much time as you need. But when an object is moving, you must predict where it is going and reach for it, coordinating the act of tracking the object with the act of moving the arm and grasping, all in the space of a second or less. If you cannot coordinate these elements quickly, the object will elude your grasp and fall to the floor.

Catching a moving object, then, is a highly complex affair. While reaching for the static object does require attention to the object and therefore perceptual feedback with which to guide the arm, such feedback need not be immediate, nor finely calibrated with the movement of the arm. But when we reach for the moving object, we must get immediate feedback as to where the object is and coordinate the movement of the arm with this perceptual feedback quickly and with precision. In short, reaching for the moving object requires more bodily skill, or precision in movement, than reaching for the stationary object, and this in turn depends upon a quicker or more precise coordination of the visual feedback with the arm—also known as "eye-hand coordination."

From a practical point of view, this coordination, being more complex, is also more liable to go wrong. If a baseball outfielder cannot properly track a moving object (as when the sun is in his eyes, or when he simply misjudges the trajectory of the ball), then his glove will not be where the ball is, and the perceptual part of the process fails him. If he tracks the movement of the ball accurately but cannot position his hand properly for catching the ball in time, then the ball will hit the wrong part of his glove or else he will fumble it, in which case the motor aspect falters. The point is that a number of complex elements go into the seemingly simple process of catching a ball, and all must be coordinated to produce the finished act of "catching." So complex is this process that, in contrast to the act of grasping a stationary object, even the most

coordinated fielder in baseball is liable, at times, to miscalculate a routine fly ball. (When this happens, it is called an “error.”)

This process of coordinating a complex perceptual field with precise bodily action is even more demanding when hitting a baseball than when catching one. In this case, the ball is moving so quickly that the batter has only fractions of a second to observe the trajectory of the ball and to judge his swing. It is difficult to predict the speed and trajectory of the ball accurately and, therefore, to time the swing and to find the ball. Even the best hitters fail more often than not.

Most skilled activities involve a complex perceptual field in which bodily coordination must synchronize with perceptual input, and properly understanding these elements is essential to mastering certain actions. It is well known that, in swinging a baseball bat, taking one’s eye off the ball is the root of the problem: the batter has failed to observe the ball, and therefore to match the swing to its trajectory. Many hitters also fail to assess the pitch, and therefore swing at bad pitches. In both cases, the desire to hit the ball overcomes the observational element of hitting, which must be balanced with the more active component of actually swinging the bat. Many difficulties, in fact, can be traced to a failure to isolate and master the individual elements that make up complex skills. (We mentioned earlier how the various elements in hitting a ball can be broken down and isolated, making it simpler to master a complex process.) Many coaches and teachers, failing to appreciate the needs of the learner, often feed into the problem by repeating certain injunctions, as if the act of hitting the ball were simply a matter of following instructions.

Kinesthetic Awareness I

Perceptual input and the ability to adjust to this perceptual information, however, are not the only elements operating in these activities. To continue with the example of reaching for the glass, imagine that you have been given a prosthetic device that lengthens your arm by, say, twelve inches, and then attempt to lift the glass

using this device. Because of your unfamiliarity with the use of the prosthetic, you would first have to observe when you have made contact with the glass, in order to accommodate your movement to the use of the new device. After using it for several minutes, however, you would get a "feel" for the device and would hardly have to think about it. In this case, we accommodate ourselves to the artificial "limb," which then becomes part of us.

Whenever we take up a new sport or play a musical instrument that is unfamiliar in our hands, we have to learn, by "feel," where things are. We play with the "object" until it feels like a part of us. The use of our own body can also become unfamiliar if we change our technique or style of doing something, as when we are shown how to use less tension in our arm muscles in order to play a familiar piano piece, or if you are right-handed and try to swing a tennis racket with your left arm.

Many defective strokes in tennis, in fact, can be traced to a similar source: we fail to connect with the ball when swinging the racket because we do not have the proper sense of its length and how to use it. And the effort to "do" the right stroke only prevents us from fully experimenting with the racket as an artificial tool and understanding its proper relationship to the ball, so that most learners go on for years not being able to hit a proper backhand or a simple volley at the net. In order to solve the problem, they need to throw out all ideas of "doing" something right which prevent them from learning how the racket works, and instead experiment with the racket as an artificial device.

It is also possible to have the feel of an artificial object in one context, but not another. In the case of tennis, many people can hit an adequate forehand; yet when they go to volley at the net, they do not have the "feel" of the racket and mis-hit the ball over and over. In this case, the learner has an accurate sense of the racket in one context but not in the other. And because he has a sense of what to "do" when he hits the forehand, he conceives his problem as a failure to "do" the right thing at the net and tries, over and over again, to apply this to volleying at the net, with little success. In this case, he must stop trying to hit the ball and instead must experiment

with the racket in order to get a sense of how it works, just as if he had never used it before.

This "feel" for an object that operates as an extension of our own limb represents another receptive element in learning a skill—namely, the kinesthetic element.[5] In hitting a tennis ball, we have to get a sense of the length of the racket; we have to feel the racket head, and use this feel to determine if we are hitting the sweet spot and whether the racket face is flat to the ball or at an angle.

Nor is this kinesthetic dimension limited to the use of rackets and other artificial devices. When we round the corner of a track, we "feel" the stress of the turn on our feet, ankles, and legs, and lean our body to accommodate to the ground. When we swing at a tennis ball and, at the last second, flick the ball crosscourt for a winner, we must judge whether we have caught the ball with the edge of the racket and adjust our swing by the "feel" of the ball on the strings. The kinesthetic sense, in fact, organizes a vast array of skilled movements but operates, for the most part, at an unconscious level. When an athlete dives for a ball and just barely catches it, or rotates his body three times in the air before entering the water, however, he is utilizing this sense at a more conscious level. After long practice, we are able to use this information instantaneously, in response to the pitcher's throw or a hard serve in tennis, to adjust our swing and achieve a high level of precision in our performance. The ability to use this sense just a little better than anyone else—that is, to use this internal feedback about what one's body is doing to make slight adjustments and corrections in one's performance—distinguishes the great athlete from the good ones.

Kinesthetic Awareness II

We have now seen that skill doesn't merely involve motor acts, but perceptual adjustments as well. In other words, skilled action requires sensitivity to *input* from the environment as well as motor *output*. But exactly how do we make these perceptual adjustments? Having seen the glass, for instance, and needing now to move the arm to adjust to its trajectory, how is the arm actually controlled in

order to accomplish the feat—in a word, how do we tell the arm what to do?

We control the movements of the arm by gathering information from the connective tissues within our bodies—in other words, from our kinesthetic sense. Observe, for instance, the act of a baby learning to grasp a toy hanging above its crib. Seeing the brightly colored object, the baby's interest is piqued, stimulating its attention to the object. It becomes excited; it begins to wave its arms and exhibits signs of wanting to get hold of the object. But it lacks control over its arm movements and waves it arms rather uncontrollably. Even when it touches the object, it cannot maintain control of the arm in such a way as to keep the arm in touch with the object. In short, it cannot control its own arm movements, even though it has actually received enough feedback with which to adjust its arm movements to the location of the object. Through its own movements, however, the baby gets feedback about what it is doing, which it correlates with what it sees. It gains control over its own movements by getting repeated feedback from its own muscles and joints and choosing the actions that most closely approximate the ones it is looking for.

The notion, then, that we make movements simply by contracting muscles hardly does justice to the sensory complexity of skilled movement. Movement involves constant feedback; without it, we would lack the most basic control, and action would be faltering and inefficient. Every movement we learn—all our speech, picking up objects, walking—involves an incredible amount of trying and doing, as well as getting feedback—not just about the environment, but about ourselves. Our entire nervous system is organized in such a way that, whenever we do something by contracting muscles, we also get feedback about the trying and can therefore adjust the amount of muscle contraction necessary to perform the action smoothly and accurately. The whole process by which a child learns new actions is therefore one of trying and then refining actions according to the feedback received, until we no longer need as much feedback and can accomplish familiar acts habitually and with little apparent adjustment.[6]

The sense of effort, then, is at the core of all skilled activity. Since muscles accomplish their purpose through effort, and since we cannot perfect their use without a sense of how much effort is being used, this feedback from our own muscles is crucial to their proper control. It enables us to constantly adjust our efforts to our desired goals, as in handling tools, playing piano, and singing a phrase of music. We learn to do things precisely by utilizing this sense of effort, and if we lose this sense, we lose the ability to control our muscles, however strong and intact they may be as motor organs.[7] This sense of effort underlies all skilled activity—in other words, all voluntary action such as picking things up, walking to the store, talking on the phone, holding a book. In short, even our most deliberate, overt motor actions are based on a fundamentally receptive element.

Whenever we set out to learn something new, it feels strange and unfamiliar. Given enough experience, it comes to feel right until, with repetition, we "get the feel" of it. Sometimes this phenomenon is called "muscle memory," and it forms the basis of all the actions that become part of the fabric of one's everyday activity and learned skills. Whenever we master an activity, we have a sensation that accompanies our doing which enables us to perform the action fluidly. It is a vast learned complex based on an incredibly rich array of sensations and feedback from our own bodies. The point, however, is that I learn to "do" things by "feeling" what I am doing; by doing, I receive information about *what* I am doing which in turn improves the doing.

This sense of "feeling" or "rightness" upon which we rely so intimately for the carrying out of our many activities can also be quite misleading. Many singing students—including myself in the example referred to earlier—associate singing with the wrong uses of the voice so that, when they feel they are singing well, they are in fact singing badly. In order to learn to sing properly, they must do something that feels entirely wrong and unfamiliar. This is also true when, as we will see later, students of athletic or performing skills have harmful habits that interfere with the body's optimal functioning. In this case, what feels "right" is wrong, and the

student must be willing to engage in an unfamiliar and unsettling activity in order to discover a more efficient mode of performance. In such cases, the student is asked not to rely on kinesthetic feedback except when it enables him to notice harmful habits that can be eradicated. He is no longer relying on his sense of feeling, but utilizing his kinesthetic sense to achieve a higher level of awareness aimed at removing habits that impede performance.

The Coordinating Function of Thought

Let us look now at a different sort of case—that of hitting the keys on a piano or keyboard. The keys on a piano are of course stationary; the goal of piano playing (at least from a technical point of view) is to strike many keys in quick succession. If the requirement in playing a difficult passage were to hit the notes individually and at a very slow tempo, the task of playing many notes in succession would be as easy as reaching for the glass on the table: the problem would be simply to hit one note at a time. Playing a complex passage quickly, however, requires the pianist to move his fingers quickly and with a high degree of precision—a task requiring tremendous skill and dexterity.

It is not dexterity alone, however, that makes it possible to perform such a feat. When I reach for an object, it is the perception of the object which coordinates my hand, making the act successful. As I said earlier, if the object is moving, then I must not only see the object but coordinate the movement of my arm to the predicted trajectory of the glass. In piano playing, however, there is no single object to be caught or struck, and the object is not moving. Here, we have lots of stationary objects that we must hit in a complicated sequence.

What, then, makes it possible to strike all these keys in such quick succession? It is the act of knowing what we want to do—that is, having a clear conception of the task at hand. How else would it be possible to play a complex passage, if not because you have an idea what notes make it up? It is my knowledge that I want to play those particular notes in that precise order that makes the action possible.

In other words, it is the process of knowing or conceiving what I want to do that coordinates the activity.

The process of hitting stationary keys one at a time is familiar even to those of us who do not play piano. When we are learning to type, we must at first painstakingly locate and strike each key individually. When we have learned how to type, however, the process becomes dramatically different. Now we know where the keys are, which enables us to orient to each key without having to look for each one. Having memorized the location of each letter, and having learned to coordinate the movement of our fingers to any desired key, we then have only to mentally spell out words we are thinking for the movement to take place quickly and efficiently. We can assist the process by looking at the keypad, but this is no longer essential; we coordinate the movement of our fingers with our mental conception of the words we are spelling. The coordination of our fingers is largely governed not by superior dexterity or the ability to perform physical actions better than a non-typist, but by our knowledge of the keyboard. Our mental conception of the letters we want to strike and their location on the keyboard, not the visual field or an innately superior ability to perform the actions of typing, governs the movements of the fingers.

Obvious as this may seem, however, the role of thought in coordinating one's fingers on a keyboard or other instruments is often conspicuously absent in musical training. In the earlier case of reaching for a stationary object, the problem was clearly one of adjusting the movement of the arm to the location of the object. This action, in turn, was made considerably more complicated by making the object move, and again required a complex coordination of hand and eye. But the piano keys don't move: the action of playing the keys on a piano is complicated by having to moving our fingers quickly from one key another. Because these complex actions involve superior dexterity (an ability to do something to the keys), many people conceive piano playing as a largely physical problem. The effort is made to strengthen the hands, to develop their athletic ability, to force them to perform feats of dexterity, even before the student has mastered, in any individual piece, an absolute

knowledge of what keys need to be played. But the knowledge of what keys need to be struck precedes the demands of being able to strike them. The difficulty is not simply in doing what has to be done, but in knowing what needs to happen, and in being able to coordinate the hands to serve this purpose. The athletic demands of playing the piano may seem largely active rather than receptive, but the act of knowing what notes to play is itself receptive, since it requires the ability to subordinate the attempt to do something to the act of being clear about what one is doing.

For want of a better term, I have called this the "thinking" element of skill. I should add that each element we have looked at so far—perception, attention, and the kinesthetic sense—is a form of thinking. In referring to hitting the notes on the piano, I mean the act of thinking in the traditional sense of having a concept or picture in your mind—mental symbols of something to be performed. In the same way that the batter needs to learn to observe the ball before trying to hit it, the musician must always put the process of clear thinking ahead of his desire to drill the fingers, to practice mindlessly, to try to be right. This is why many musicians are at their most musical, and do their best musical "thinking," away from the instrument: it gives them time to clearly conceive how something should sound (i.e., to "hear" what they want) and to form a clear idea of exactly what they are trying to do.

This also explains why musicians who write their own music can almost always play what they write. Having thought of the music themselves, they necessarily have an absolutely clear conception of what they want to play and how it must sound. It is no coincidence that gifted composers are often gifted technically: you can usually do what you can imagine clearly, or what you have conceived yourself. Even technically untrained or untalented musicians are nevertheless often able to play passages that they themselves have conceived. Problems of technique usually don't exist for performers playing their own music.

I should also mention that, in music, the mental knowledge of what notes to play must progress through several stages. Initially, the pianist must know exactly what notes to play, in what rhythm,

and with what fingers. When these mechanics are learned, the ability to technically execute the piece becomes second nature; playing the piece then takes the form of knowing exactly what you want the piece you have learned to sound like. At this stage, it is not the desire to play certain notes that governs the performance but one's musical intention, so that the thinking that governs the performance shifts from a purely symbolic kind of thought to aural or musical conception—otherwise known as musical interpretation. You no longer think about what notes to play but about what sounds you want to express. In other words, you coordinate the activity with your "ear." (This progression is also true, to a lesser extent, in typing. At first it is letters and words that organize the movements of the fingers; later, one is no longer conscious of specific letters or even words but simply thinks entire thoughts, and the hands "know" which keys to type. The process, however, is not as complex as that of musical performance; in music, it is the emotional and artistic ideas being conveyed that govern the performance—more a "how" than a "what.")

Having a clear conception of what one wants to do also has a guiding function in performance as distinct from a controlling function. Many golfers, for instance, report that, before a difficult putt, they carefully visualize in their minds what they want to do and how the putt will take place before actually hitting the ball.[8] This "mental rehearsal" is a form of visualization that helps the performance, but it isn't quite the same as conceptualizing what notes to play on the piano. In the latter case, the notes must be clearly conceived in order to play successfully; in putting, the act of mental rehearsal assists a performance that the golfer may already be capable of executing successfully. Both examples, however, illustrate the controlling function of thought in facilitating performance, and the role of conceptualizing in governing motor activity.

CHAPTER THREE

Tension in Performance

We have now discussed some basic elements of skill. First we looked at the fundamental principles of an intelligent approach to skill that allow the learner to avoid the pitfalls inherent in learning something new. Second, we looked at the elements of skill, including the voluntary, reflex, and receptive components. As we saw, skilled actions are comprised of deliberate actions (swinging a bat, for instance), but also of various automatic and receptive components (such as basic body positioning and learning to see the ball). In attempting to learn a skill, the beginner's desire to achieve his end leads him to focus far too much on the voluntary components of the action, and to short-circuit these other elements that are so critical to successful performance.

I would like to turn now to a different aspect of skill—namely, the role of the self in skilled performance. That the body plays an important role in skill is so obvious that it hardly warrants mention; yet the true significance of this subject has only begun to be fully appreciated. Most skills focus on improving bodily control by practicing, strengthening, and perfecting certain movements. The idea that the body must be drilled and commanded is based on the assumption that bodily functions are largely voluntary and that, by exercising specific muscles and movements, we can gain greater control over these functions. Yet it is well known that most bodily

functions—including the working of the muscular system—are largely unconscious. Attempts to control the body through exercise, therefore, do not address unconscious habits and their harmful influence in performance. Even more importantly, they leave our ability to gain full conscious control of ourselves only partially realized. By reeducating the body and developing our ability to kinesthetically perceive what we are doing in activity, however, these habits can be raised to a conscious level, making it possible to fully realize our potential to perform at a higher level.

Let's begin by looking at the problem of kinesthetic awareness and its application to skilled performance. In contrast to the many skills that, from a young age, we learn unconsciously, the mastery of performing skills requires a prolonged and demanding period of deliberate study based on a highly specialized technique formulated exclusively for a particular instrument. Given a combination of talent, good teaching, and sound technique, it is hoped, mastery is sure to follow.

Even talent applied to a sound technique, however, cannot ensure success if the performer uses too much tension while implementing this technique. Take the case of a singer who is having trouble with her vocal range, and who makes an unnecessary effort to reach high notes by putting her chin up and "reaching" for the notes, which is in fact part of a larger tendency to tense the muscles of her neck and jaw, as well as to gasp in breath and arch her back when preparing to sing. Many teachers, in such a situation, will urge the student to relax while continuing to have them sing scales. But the more she tries, the more she will pull back her head, with the result that both student and teacher become increasingly frustrated.

The problem, in this case, is that the singer is making unnecessary actions that interfere with her singing, and trying to improve her vocal technique cannot solve this problem because it has nothing to do with technique. By making adjustments and reducing her overall level of tension, however, it becomes possible for the singer to recognize and prevent these tensions, with the result that her tone becomes lighter, more effortless, and more natural. Simply by

learning to recognize and prevent the unnecessary tensions she is making while singing, the singer is able to overcome her problem.

To cite another example, a singer consulted me because she couldn't get enough air to complete even relatively short phrases. When I observed her the reason was apparent: she was so worried about getting air into her lungs that she wasn't breathing out adequately. When she began a phrase, she expanded her ribs so forcibly to get air that she could no longer breathe in and out normally. When I asked her why she did this, she explained that when she began her vocal training, she always struggled to get enough air for long phrases; in order to rectify this problem she had been actively taught to take in air until she was literally holding her breath in order to sing. This technical difficulty had been compounded by her emotional fear that her success as a singer depended on this strategy, with the result that she tried even harder and made the problem worse. By restoring her entire system to a reduced state of tension, and then focusing on letting her breath out, she found that she was breathing more fully and didn't need to take as much air in. As in the previous case, the singer's problem was caused by her own harmful manner of singing, and no singing technique could solve her problem because her entire idea of singing was wrong. Her breathing and vocal problems were ultimately caused by her harmful tensions; by learning to use less effort, she was able to restore normal breathing and vocalizing.

These examples demonstrate a fundamental fallacy underlying virtually all instrumental and performing techniques. Students are asked to focus, often for hours every day, on technical issues aimed at mastery of the instrument. But what happens if, as the basis for implementing this technique, the student brings too much tension and strain to her practice? The student's efforts are undermined by her very own habits, and no amount of technique or specific meddling can solve the problem. Only by kinesthetically noticing and preventing this tension is it possible to remove the impediments to fluid action.

But how does one control this tension, or become aware of it during performance? Normally we address these sorts of tension-

related problems by attempting to relax or, in some cases, to control our posture. But the tensions we experience in movement are in fact part of a larger, ingrained pattern of movement that interferes, at a very fundamental level, with the way the body is designed to work in performance. This aspect of our functioning represents a crucial and unrecognized region of human performance, and unless we understand this design, we are simply scratching at the surface of a deeper problem. In order to understand this aspect of skill fully, let's look in more detail at how the body works in movement.

1. The Pattern of Tension

If you observe a child performing a simple task, you will notice how effortlessly he or she is able to do what adults find so difficult. Children can sit on the floor quite happily for hours; in contrast, the actions of most adults are awkward and tense, and few adults can sit without support for even a few minutes without some discomfort. Yet it is not so easy to identify what accounts for the difference between the effortless, smooth performance of the child and the strained, labored actions of the adult.

In fact, though, tension in movement follows a systematic pattern that can be readily observed. If, for instance, you ask someone to rise from a sitting position and observe how he performs the movement, it will be immediately apparent that, at the point of beginning the movement, he will slightly retract the head by tightening the neck muscles. This neck-muscle tension will be accompanied by tension through the shoulders, back, and legs, which will increase as he rises onto his feet (Fig. 4).

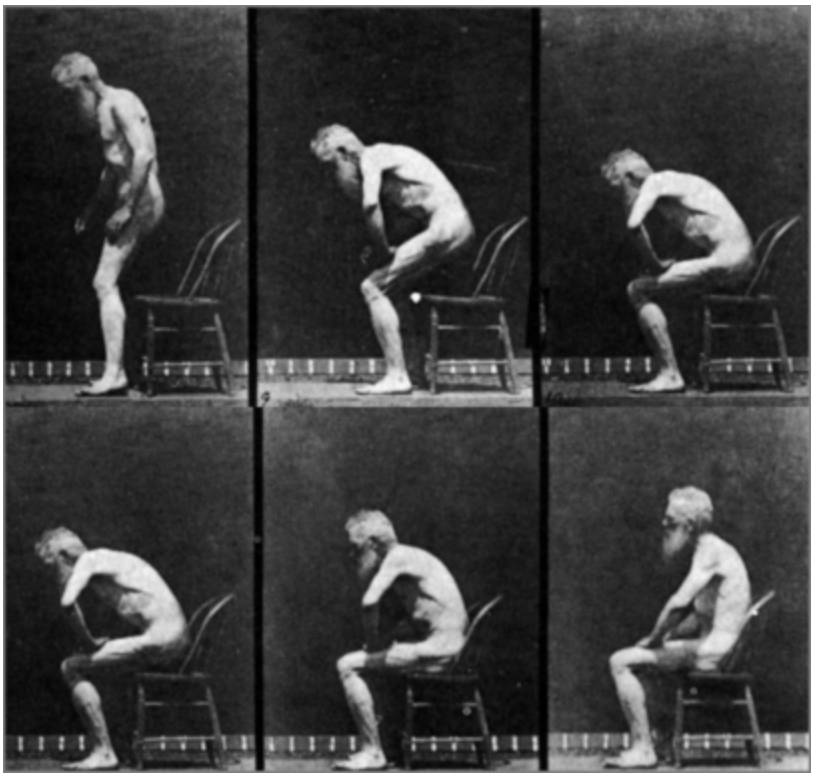

Fig. 4. *Old man showing an exaggerated tendency to tighten his neck and trunk muscles during the act of sitting down.*

Understanding this pattern of tension provides the key to altering it. If you slightly adjust the balance of his head so that the muscles at the back of his neck lengthen, this will exert a stretch on the muscles of his back so that, instead of shortening, his torso will tend to lengthen. This lengthening in the muscles of the neck and back will increase sensitivity to changes in the level of tension. When he again prepares to move, he will be able to perceive the increase of tension and to maintain the natural length and support of his torso during movement. When he then stands up, there will be a change in the overall quality of the movement, which will involve less muscular effort and a reduction of bodily strain.

I should point out that performing this procedure is by no means easy and should not be attempted by an untrained individual. If the head is adjusted in such a way that the neck muscles are overly stretched, the result is that the neck muscles will tighten instead of

releasing. The procedure I am referring to requires the skills of a teacher specifically trained in the ability to make changes in the muscular system and who is experienced in how this system is designed to work in movement.[1]

When once we identify this pattern of tension in movement, it can be observed easily in a number of activities. Take, for example, the act of bending to pick up something. Most people will retract the head forcibly as if to counterbalance the forward movement of the torso. The result is a strained and awkward movement, performed with a great deal of muscular effort. If, in contrast, the neck-muscle tension is again detected and prevented, it becomes possible to lower the body by simply bending at the knees, without a marked increase in muscular effort in the neck and back.

This pattern of tension is particularly evident when we perform desk work. The average person, while sitting at a computer, will drop into a slump and retract the head to look at the computer screen. This postural “slump,” however, is only the visible manifestation of an underlying pattern of tension. If a skilled teacher again produces a stretch in the muscles of the neck and back by adjusting the person’s head, the underlying tensions that caused the harmful slump become evident. The moment he begins again to type at the computer, the head will visibly retract due to shortening in the muscles at the back of the neck, and the body will be forcibly shortened in the chest by muscular tension in the neck and shoulders, the entire postural change resulting from an increase in tension.

2. The Head-Torso Pattern

Why does movement begin with an increase of tension in the neck, and why is the relationship of the head and torso crucial in preventing this pattern of tension? If I again ask the person to slump carelessly, his body as a whole is dragged downward, and this downward pressure actually interferes with his sitting balance, causing him to lean heavily against the back of the chair or, conversely, to resist this collapse by arching his back and sitting up straight. When, in contrast, I adjust his head, this sets up a stretch in the muscles of his neck and back, his body tends to lengthen and, without any apparent effort, regains its natural support against gravity.

The reason for this response is that the body is designed to lengthen or support itself against gravity. When sitting or standing, the body has to maintain a kind of background muscle activity in order to achieve upright balance. We are not normally aware of this muscle activity because it is unconscious and automatic, but we have only to feel someone's legs muscles while he or she is standing to realize how much muscular work is required to simply stand erect. Normally we are able to maintain this posture with a sense of complete effortlessness and ease, giving us the basis for a whole range of skilled activities that we can perform effortlessly. But when we retract the head and shorten the body, this muscular system is interfered with, and the result is postural collapse, imbalance, and compensation. In contrast, the lengthened condition of the head and torso produces the conditions under which this muscular system can efficiently and effortlessly support the body.[2]

This explains why the relationship of the head and torso is so central to the working of the muscular system. Because the spine and the muscles around it form the central support network of the body, it is the dynamic relationship of the head to the spine that maintains the efficient working of this musculature.[3] Young

children, with their heads delicately balanced on lengthened spines, use this mechanism perfectly. They present a picture of complete grace and ease in movement, and are able to sit comfortably and use their arms in a wide variety of movements with virtually no sense of strain or effort (Fig. 5). Slumping at the computer, however, interferes with this relationship, resulting in a loss of postural support and increased strain in performing movements that rely on this support.

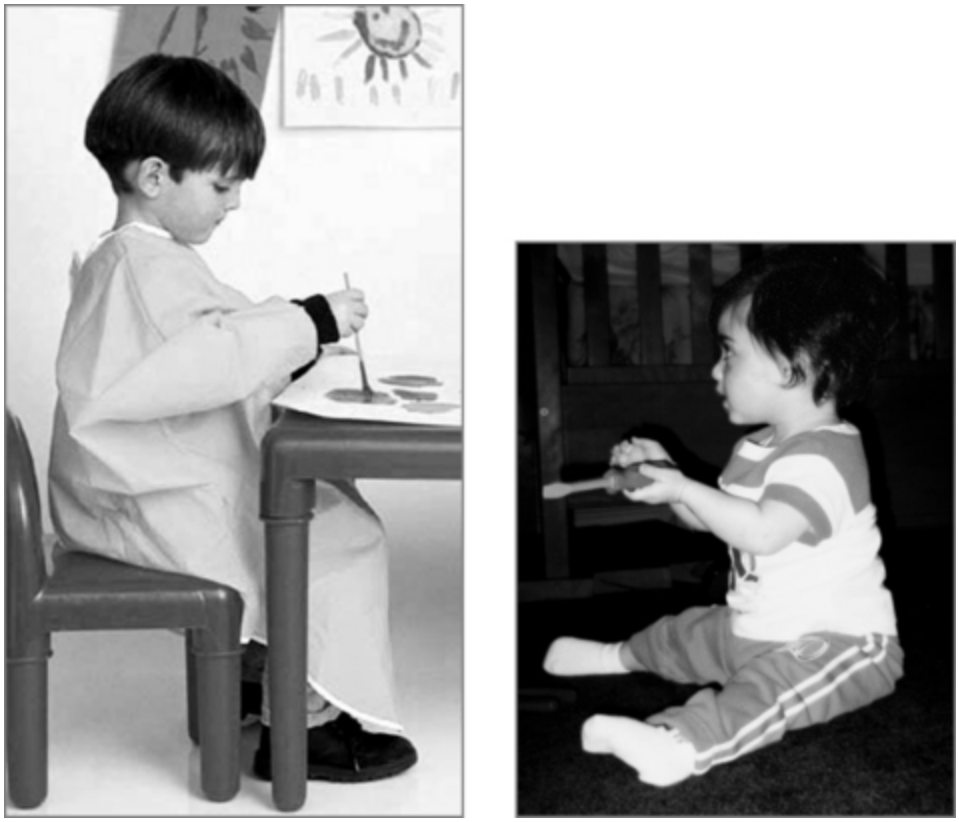

Fig. 5. *Children sitting and using their arms effortlessly*.

3. The Basic Principle of Movement

This relationship of the head and trunk is one of the basic organizing principles in human movement. If you observe a child sitting or standing, you can see that although he or she must learn to balance on two feet, its upright posture—the support of the body on two feet—is organized quite automatically. Its movements, its orientation in space, and its postural support against gravity are all organized at the reflex level so that the child can choose what to do without having to figure out the details of what particular muscles to use in any given act. Once the child decides to move by looking in a particular direction, this initial movement organizes how the body moves and, with virtually no effort, it accomplishes the intended action. This upright system, it is no exaggeration to state, is truly the basis of all complex skills, and as long as it is not interfered with, we are capable of the most remarkable variety of actions—and of performing them quite effortlessly—throughout our lifetime.[4]

This same automatic system can be observed in animals. If a cat is thrown on its side, it will attain the four-footed posture by righting itself with an initial movement of the head. When the cat runs, it is again the head that leads the lengthening of the body in the direction of movement (Fig. 6). If the cat needs to crouch in order to eat or to stalk its prey, it automatically assumes a particular position or attitude—again organized by the head-trunk relationship (Fig. 7).[5]

Fig. 6. *Cat leaping, with its head leading the movement and the body lengthening*.

Fig. 7. *Attitudinal reflexes in a four-footed animal: lion crouching to feed*.

Our erect posture is much more unstable than the four-footed stance of our animal ancestors. It is rare to see a cat move awkwardly or strain in any way; virtually every movement it makes is a picture of poise and fluidity. Even when a cat makes a strenuous movement such as leaping onto a table high over its head, it seems to recover with little trouble. The human upright system, however, becomes posturally disrupted far more easily. Even so basic an action as sitting can, within a few moments, become disturbed if a child is asked, at too young an age, to control the movements of a pen while sitting at a desk. As soon as the child begins to write, he will begin to contort his body in order to control the movements of

the pen, resulting in a slumped and tense overall posture (Fig. 8). Sometimes, as in the case of Josh mentioned earlier in this book, these habits become so extreme that the child has difficulty controlling the movements of his arm and hand while writing. When balanced muscular support is reestablished, however, the child is again able to sit and write or draw, without slumping or tensing his shoulders and arms.

Fig. 8. *Child twisting and tensing his body while writing.*

Skilled activity, then, is comprised not simply of specific learned actions but is based on a total pattern that serves as a kind of background upon which these specific actions are based. The use of the hand may seem to have little to do with this larger system. Yet even the ability to play piano is ultimately dependent on our overall muscular support, since the entire range of skilled human behaviors —including tool-making and other fine motor capabilities—is based on our upright posture and the head-trunk pattern that organizes it. In this sense, even the pianist whose skill remains unmarred by age, but whose general condition deteriorates as a result of the loss of poise over time, is in a very real sense losing skill. Skilled action and the underlying organization of upright posture are two sides of the same coin.

This same principle of movement applies to the singers' difficulties. They had developed harmful tendencies that ultimately interfered with the functioning of their voices. These tendencies had been compounded by hours of practicing in which they constantly struggled to overcome their problems by utilizing an ever-increasing amount of tension. When this system was restored and they were able to kinesthetically notice these tensions, they could then breathe and vocalize in the way they were naturally designed to do. The key to smooth performance in each of these situations is not to gain greater specific control but to restore the basic pattern governing movement.

4. Specific Problems

Let's look now at another tension-related difficulty of musicians —that of problems with a limb, shoulder, or other specific part of the body. Most musicians suffer, at one time or another, from back pain and other tension-related problems. For instance, a violinist may have no problem with his intonation, phrasing, or any other particulars relating to the performance itself, but his bow arm may get very stiff or even crippled. Again, exercises or attempts to bow differently are of little avail; the solution is to analyze the problem in terms of a wrong pattern of tensions that the performer associates with playing violin. In such a case, the problem manifests as a physical ailment, not as a faulty musical "product"; but the cause is, as in the case of the singer, a pattern of tensions that interferes with the performer's playing. By becoming kinesthetically aware of these tensions, it is possible to eliminate harmful and often crippling patterns of tension.

For many musicians, tension becomes much more than a nuisance. Stories are legion of violinists whose careers are ruined by tendinitis and shoulder problems, and pianists who develop severe dysfunction of the arms and hands. There are countless experts trained to ease these conditions by treating muscle soreness and inflammation with physical therapy, exercises, relaxation techniques and, in extreme cases, surgery. Such problems, however, are not fundamentally medical in nature. In most cases, the wrong working of a limb in a musician stems from harmful habits that have developed unchecked over time. If these habits can be eradicated, the problem will often disappear along with the habits.

To illustrate, let's look at the case of Joan, a young musician with aspirations to become a professional flutist. Joan began lessons at the age of fourteen, and a few years later she was an accomplished musician who got into college on a scholarship. By the end of her second year of college, however, she was having physical

difficulties. Her shoulders were constantly in pain, and she was having problems with her breath control. After consulting with physical therapists and learning a relaxation technique, she took a break from playing, but her problem persisted until, by the end of college, she was diagnosed with bursitis and was under the supervision of a medical specialist who warned her that she might have to give up playing altogether.

When I first worked with Joan and asked her to play for me, it was immediately clear that she had developed the tendency to use far too much tension to support the flute and to breathe, which was evident both from the amount of tension in her shoulders and her manner of breathing, which was clearly exaggerated and forced. These specific tensions, however, were only part of a larger pattern of tension throughout her neck and trunk, which she tended to throw backwards in order to support the flute, as well as her legs, which she held in a kind of rigid stance while she played. By identifying and reducing these tensions, we were able to restore her natural coordination so that she could support her flute as well as breathe much more easily while she played.

Joan's condition, which is typical of so many young musicians who find themselves in physical trouble, was indicative of a fundamental gap in her training as a musician. Because she was so highly motivated, Joan was considered to be an ideal student. She worked hard, practiced longer than her fellow music students, and progressed at an unusual pace. However, except for the occasional instruction from her music teachers to pay attention to her posture and her breathing technique, she had developed a number of harmful habits that had gone unnoticed. The very strengths that had enabled her to become a technically accomplished musician were inseparably connected with a faulty manner of playing that had literally crippled her.

This example illustrates an important principle relating to problems of functioning in the limbs or other parts of the body. When a performer suffers from chronic back tension or tense shoulders, the usual approach is to try to correct the specific condition through relaxation and exercise. However, the specific

condition is in fact part of a larger condition of tension and interference that involves the entire muscular system, and in order to solve the problem, it is necessary to address this entire system and how the musician uses it in activity. In order to solve her problem, Joan not only had to unlearn her harmful habits; she had to completely relearn her flute technique as the basis for being able to play in a coordinated way.

In a certain sense, then, Joan's problem was not really physical at all, since the physical tension was symptomatic of a harmful way of playing the instrument. Nor were these harmful habits specific to the technique of playing the instrument, since they involved an entire pattern of activity that she must prevent as a starting point for gaining an increased awareness and control over her own action. This, in turn, removed the underlying cause of her physical symptoms and gave her an increased command over her playing and an improved use of herself at her instrument.

5. The Problem of Relaxation

Let's look now at the problem of muscular tension and how to reduce it. There are few musicians who do not, to some degree, suffer from muscle tension and attempt in some fashion to correct it by stretching or relaxing specific muscles. As obvious and logical as this approach seems to be, however, it actually fails to address the problem. Muscle tension is part of a complex system that must always be addressed as a whole. Specific efforts at relaxing invariably fail to do this.

Let me illustrate with the case of a pianist who consulted with me because he was suffering from chronic low back tension. He had been shown how to relax and had learned to adjust his sitting balance so as to reduce the tension, but his problem had gotten worse. After observing him sitting at the piano, I pointed out that he was rigidly contracting and overworking the muscles of his back in order to maintain his sitting balance. When he attempted to relax his back by adjusting his sitting balance, he collapsed slightly, which momentarily reduced the tension in the lower back. Ultimately, however, this strategy only made his problem worse, because when he periodically straightened up, he was forced to compensate by tensing his back muscles even more to support himself. Over time, he had developed a generally harmful condition of tension that had undermined the normal functioning of his entire muscular system. By helping him to restore a general condition of improved muscle tone and support, I was able to show him how to sit and support himself more comfortably. After several more lessons, the condition of tension began to lessen and he was able to stop overusing the muscles in his lower back.

This example illustrates the problem with attempts at relaxing specific muscles. When we suffer from strain or tension in a particular area of the body, it is easy to assume that the problem can be addressed by treating that one muscle or set of muscles. The

human muscular system, however, works as an interrelated whole, and specific muscles assume their proper level of tension only when this entire system is in balance. By attempting to relax the muscles of his lower back, the pianist had only interfered further with the support of the entire trunk, with the result that, when he needed to sit upright, he had to compensate with even more tension in his back. By restoring the coordinated support of this entire system, his back muscles could indirectly relax and, in so doing, assume their proper level of tone.

Specific muscles, then, work properly only in the context of the whole, and understanding how the entire system works is therefore the key to relaxation. The commonly held concept of relaxation is based on the mistaken notion that muscles which are too tight need to be relaxed, forgetting that muscles serve a positive function in supporting and moving the entire skeletal system. Without such a positive concept of how the entire system is actually designed to work, it is impossible to have a correct idea of how much any individual muscle is meant to contract or relax. The key to relaxation is not to reduce tension in specific areas but to understand in a positive way how to coordinate the muscular system as a whole.

6. The Mind/Body Dichotomy

The above examples demonstrate a fundamental fallacy underlying virtually all instrumental and performing techniques. Musicians are sometimes taught to pay attention to posture, breathing, and the like, but for the most part, this aspect of their training is regarded as far less important than technical mastery. If a physical problem develops, it is treated as a clinical problem unrelated to musical technique. Tension-related problems, however, are directly related to how the musician plays and therefore cannot be separated from one's technical approach to the instrument.

The development of skill at an instrument and the ability to use ourselves properly when executing specific techniques are in reality continuous domains, since both emanate from the self. A true musical technique should be consistent with a healthful approach. Yet few musicians approach music this way. They develop specific technical skills at the expense of proper bodily coordination; they practice and practice in the hope of increasing technical proficiency, but at the expense of overall control and physical well-being. If problems occur, they take pain-killers or receive treatments to relieve the problem. But this approach ultimately backfires. If one practices intelligently, playing should be free of strain and debilitating tension. If physical problems develop, one must ultimately seek not for a physical cure but a more intelligent approach to the instrument.

This false dichotomy between technical skill and bodily coordination, in a very general way, reflects the mind/body split. Physical symptoms are relegated to the bodily sphere, technical issues to the mental. (The same is true, as we will see later, of the technique-versus-interpretation dichotomy. In this case, the interpretive aspect of music is accorded the higher, more spiritual and intellectual status; technique, in comparison, is relegated to the

bodily domain.) This split reflects our general ignorance and lack of concern over how the human body functions and how to properly care for it. If something goes wrong, we simply want to fix it so we can get on with our lives; physical functioning is regarded as separate from what we are doing in activity. But of course the two are interconnected, and understanding this means that we must treat physical problems as a potential sign of something wrong in both our instrumental technique and living in general. A complete technique must lead not only to technical expertise, but to an increased knowledge and awareness of one's own habits at the instrument. And it must teach respect for that most indispensable of instruments, the human body.

7. Caring for Our Instrument

Every once in a while one observes that rare performer who seems to play effortlessly and who is completely free of physical tension. Even these gifted performers, however, tend to deteriorate over time. It is important not simply to be in good shape or to enjoy the blessings of natural physical coordination, but to have conscious command over these factors in order to ensure that these desirable qualities are never lost. Otherwise, we are always at risk of developing harmful habits and of ultimately jeopardizing our most precious instrument: ourselves.

We have all heard, by now, the concept that the musician's instrument—whatever *other* instruments he may use—is himself; singers are particularly aware of this and sometimes refer to *themselves* as their instrument. Yet how many of us properly care for this instrument, or fully appreciate its use and function? Even when we accept in principle that we must care for this instrument, we still rarely think in terms of maintaining optimal conditioning to a ripe old age. Musical or performing technique should ultimately be consistent with a balanced and moderate style of living. The goal, in learning an instrument, is not simply to get the best results from the instrument for the short term, but to work on a principle that ensures the best use of it over the course of one's lifetime. Any technique that fails to offer this is, quite simply, inadequate.

CHAPTER FOUR

Tension and Performance Anxiety

Before looking at the critical role of reaction and habit in skilled performance, let us turn first to the problem of performance anxiety. Stage fright (to use another common name for this phenomenon) is a problem so rampant and debilitating that many, if not most, performers accept it as a fact of life. It is also a remarkable fact that, in the literally thousands of years of pedagogical practice, including the last hundred or so years when psychology has recognized performance anxiety as a legitimate problem, there has been little progress in addressing it besides the use of relaxation techniques and, in some cases, therapy to deal with attitudes that underlie this condition. But we humans, in spite of our faults and neurotic tendencies, are endowed with amazing powers of consciousness and the potential for awareness and control. Why then should we accept stage fright as a fact of life? Given the proper knowledge about tension and how to control it, it is possible for any individual to eradicate performance anxiety and to gain an increasing awareness and control over reaction in performance situations.

It is not within the scope of this book to deal exhaustively with the problem of performance anxiety, which has social, clinical, and

psychological ramifications. Furthermore, a full treatment of this subject would require more technical physiological description than would be appropriate in this book. However, it is useful to discuss some of the general characteristics of performance anxiety and how to control it, beginning with the issue of educational methods that tend unwittingly to cultivate this problem in children.

1. Structured Learning

If you observe school-age children in their various activities, it is not difficult to appreciate that pressure in school is a fundamental part of their daily experience, particularly in recent years. In his book *How Children Fail*, educator John Holt describes the terrific pressure that children are under in school, and their constant struggle to negotiate the demands made upon them by teachers. Holt describes the case of one boy who continually tripped and fell during soccer games. This behavior baffled him until, one day, he realized that the boy was under so much tension during games that the only way he could relieve it was by falling down.[1] Holt describes other children who, when asked math questions, were so afraid of getting the wrong answer and appearing stupid that they developed all sorts of clever strategies for avoiding the teacher's questions.

Unfortunately, these same problems continue well into adulthood. Many adults, when trying to learn something new, simply can't function, becoming flustered, awkward, strained, and often losing their heads. Even as adults, we employ strategies for avoiding situations we find painful; we are more anxious to be right during a discussion, or to look good on the tennis court, than to admit that we simply don't know the answer to a question or need help in learning how to hit the ball. Although we learn to disguise it, many of us have as little confidence now as we had as children, and we have effectively lost the desire to learn because it has long since been replaced by the need to win or to look good in front of others.

The problem, of course, is that learning methods in school cultivate these attitudes by placing us constantly under pressure to be right without providing the proper environment for learning to overcome our fears and developing the confidence and the ability to exhibit grace under pressure. For the vast majority of children,

school becomes a process of surviving a series of unpleasant and unavoidable ordeals.

But how does one overcome this sort of fear? We have already seen several ways of avoiding the pitfalls of our own reactions in difficult learning situations, as well as how to create learning environments that give us the freedom to experiment. I mentioned earlier the example of a friend who could not learn to drive. Her previous teachers had all dealt with this situation by having her get behind the wheel of the car in normal traffic and then reassuring her while she was in a state of near-panic. This approach, however, only perpetuated the problem, since it exposed her to the frightening stimulus while exhorting her to overcome these responses. She needed a structured learning environment that provided the opportunity to master discrete elements of driving, while being free of the responsibility of having to actually handle the car or worry about traffic—a process I will examine later in more detail. This removed the anxiety-provoking stimulus and gave her a chance to learn, to master the elements required to drive and, ultimately, to gain the confidence she needed to handle the car entirely on her own.

This example is a very clear demonstration of how, even when we are taught by well-meaning teachers, methods of learning actually cultivate attitudes of fear and failure by placing us under pressure, without giving us the tools and the structure for dealing with the situation. Instead of providing us with opportunities for developing confidence and a positive attitude about learning, school often teaches us to avoid rather than welcome new and challenging experiences.

It may be argued, of course, that many children do well and even thrive in the classroom, and that when schools produce such success stories, they are doing their job. But schools are not lotteries; it is not the teacher's job to sift out the talented from the weak and to then claim success for the methods being used on the basis of these few success stories. Schools are responsible for helping every child in the classroom. What we observe, in the many cases where "smarter" children do well, is not good teaching, but simply a rising

to the top of those who are the “winners” and who therefore enjoy, or seem to enjoy, the demands placed upon them. The true test of good teaching is whether every child is learning, not just the talented. If that is not happening, then the style and method of teaching are basically faulty.

In a moment, we will discuss the all-important element of self-awareness and control that makes it possible to actually reverse the anxiety reaction that occurs in performance situations. But the first demand in trying to address the problem of performance anxiety is not greater control or even self-awareness, but an approach to learning that allows for a constructive, confidence-building process in which the student is given a chance to learn without fear of failure. Allowing mistakes, providing an environment where the learner is encouraged to discover his or her real capabilities, and actively supporting students who are struggling with performance situations—these are the elements that help to build confidence and to reverse performance anxiety.

2. Working to Principle

Preparation is another crucial element in learning to overcome performance anxiety. It is remarkable how many performers, as miserable and worried as they get about performing, nevertheless fail to take the necessary preparatory steps to equip them for the peculiar pitfalls and demands of the performance situation. For instance, a musician may be quite able to play a piece without forgetting any part of it during rehearsal, but lose his train of thought when under pressure. This may seem an unavoidable by-product of stage fright, but it is often caused by inadequate memorization of the piece. In order to be fully prepared to perform under pressure, the performer must consciously relearn the piece in painstaking detail. It is not enough to be able to play a piece well during practice sessions. To be truly ready, the performer must be absolutely clear on each detail of his performance so that he is no longer thinking about "getting it right," but only about releasing what is already within him.

The same is true of handling the anxiety of performing in front of a large audience. There is of course no way to replicate the stress of a large-scale recital, but it is certainly possible to provide oneself with as many "mock" performance situations as possible, and in so doing to focus on strengthening one's ability to handle such situations by paying specific attention to one's breathing, reactions, and so on. One of the best ways to learn poise under pressure is through experience. The more prepared we are, the more we are able to face the most challenging circumstance of a packed audience, and to do so with a certain degree of confidence and a level head.

One's daily discipline and work habits are crucial elements in meeting the demands of performing. When we learn a performing or athletic skill, we are doing much more than simply mastering a set of movements or learning to play notes. We are unlearning our own

harmful reactions, emotions, and attitudes—in other words, we are learning about an aspect of ourselves. We are also mastering an art form that contains values, traditions, and, in most cases, an implicit aesthetic philosophy. As a means of doing this, we must cultivate the attitudes proper to this discipline at all times. When we practice at our instrument or play a sport, we must consider each situation and every moment as part of an overall discipline demanding self-control and attention to the principles of what we are studying, extending even to our daily conduct. Just getting the violin out of its case is, for many musicians, a kind of chore. In a peculiar way, it is precisely during these mundane tasks that we most need to learn to pay attention. We have only to observe how some passengers getting onto a plane become agitated and even irrational as they try to get their luggage into the overhead bins so that they will not hold people up in the line behind them to realize how easily the average person loses control under pressure. If we cannot maintain our equanimity in so mundane a situation, how can we expect to remain poised and alert when we are giving a recital in front of a large audience? If we want to learn to overcome performance anxiety, we need to learn to pay attention precisely when we tend to be the least attentive—namely, during the mundane tasks that we usually rush over. Ultimately this prepares us for the more demanding situations we will encounter as we face greater career challenges.

In general, this sort of overarching discipline of work and conduct is exemplified far better in Eastern martial arts study than in Western approaches to skill, where personal glory is highly valued, and where athletes and performers are allowed to indulge in the most fantastic displays and unhealthy attitudes, including the desire for attention and concern for results. A good basketball or soccer coach ought always to insist on team play, because true excellence in these sports requires not just skill in scoring but also in knowing when to pass. Yet how many coaches object if one of their players, failing to notice a teammate in a good position to score, takes a shot for himself, if in the process the selfish player scores a crucial goal? Disciplining the player in this situation will often be unpopular, even with the players themselves, who are usually more interested

in winning than in playing as a team. Yet this value is crucial if the coach wants all players to rise to the level of their true potential. We must always stick to principle, for it is this discipline which tempers our own drive to succeed, our blind doing, and our lack of intelligence, ultimately preparing us for greater challenges to come.

In sports, impulsiveness and the drive to win often contribute to performance anxiety. To illustrate with a personal example, a friend and I had a friendly rivalry in ping pong. Although we were evenly matched, I rarely played up to my potential and usually choked under pressure. One day I decided that instead of worrying about winning, I would focus only on playing up to my own potential, whatever the outcome. I was surprised at how well I played. Because I was no longer worried about making winners, I could focus instead on making shots I knew I was capable of making. The point is that I had not been playing up to my potential because I had focused too much on results. Too often our desire to be right makes us more worried, not less; when we learn to shift our attention to what we are capable of doing and away from what we think we should be doing, it focuses our performance and removes anxiety.

The principle of maintaining focus also applies to practice. When playing a piece of music or practicing a routine, many students stop to correct mistakes. This is a bad habit musically speaking, and it also cultivates the harmful habit of doubting and altering course in midstream. Once you make a decision to play a piece or perform a routine, you must stick to your decision to try it out and not worry about the result. The same is true of evaluating mistakes. We must learn to be detached both about our successes and our failures; our job is to pay attention to ourselves regardless of the outcome, and not to judge one way or the other.

When we work at mastering a skill, we are ultimately learning to master an aspect of ourselves, and this means that we have to pay constant attention to our own conduct. Most of us worry continually about results, which is of course counterproductive and interferes psychologically with our ability to perform. But the ramifications of this attitude go well beyond its impact on our immediate performance. Concern with results robs us of the discipline

necessary to achieving real mastery. The teacher of Zen archery is not interested in how his student performs but only whether he practices with the proper discipline and attention. When, after years of practice, “It” finally happens and the student rejoices at having made a perfect shot, the teacher rejects the student’s response, saying that he (the student) cannot take any credit for something he did not do.[2] Attention to oneself and to “right action” is the only matter of any consequence. Judging performance by results is, to put it bluntly, an inferior approach to skill, since it does not pay proper homage to the discipline that underlies skill and aims at immediate improvement at the expense of reaching our highest potential. The ultimate achievement in skill is complete mastery over elements of oneself, not external feats that garner rewards. In order to accomplish this, we must always strive for our highest potential while remaining detached about external results. In doing this, we learn to master our own conduct, not to worry when we make mistakes, and not to identify with our mistakes or our achievements. Abiding by a higher standard of achievement, we learn to keep our heads in demanding circumstances and become better prepared to face pressured situations with discipline and detachment.

3. Performance Anxiety and Conscious Control

Even disciplined self-preparation and a good mental attitude, however, cannot entirely eliminate the fear of getting on stage in front of a large audience, where the performer faces humiliation and even graver consequences. Many performers feed on this state of heightened anticipation, rising to the occasion and pushing themselves to greater heights. For others, the response is positively crippling and debilitating, interfering with performance, creativity, clear thinking, and spontaneity—not to mention enjoyment.

We've seen that one of the reasons for this response is that many people cultivate harmful attitudes that lead, in stressful circumstances, to anxiety and overreaction. We tend to lose our heads, becoming anxious, upset, and tense. Lacking the resources or the developed awareness that would enable us to exercise control, we deal with the fear by becoming even more protective and tense.

By cultivating greater awareness and control, however, it becomes possible to reverse this condition and to remain poised under even the most demanding circumstances. By learning to recognize the increase in tension and to restore the balance of the entire system, one can release the physical tension and prevent the anxiety response.

Two elements are required in order to be able to achieve this level of control during performance situations. The first is a knowledge of the muscular system and how it works as a coordinated whole. The stress response is a physiological mechanism that prepares us, when faced with danger, for fight or flight. These changes include increased discharge of adrenaline, heightened muscle tone, accelerated heart rate, and increased blood flow. However, the nervous system can trigger the opposite restful state as well, and the key to this calm and balanced state is the coordinated working of

the muscular system. When this system is in balance, breathing is full and unimpeded and muscles are toned but not tense. Restoring muscular balance establishes indirect control over the nervous system. Uncontrolled reaction and anxiety are replaced by a restful state, reversing the fear response and leaving in its place a sense of alertness and calm.

This balanced state of tension, however, is not the same as muscle relaxation. Many performers attempt to gain control over the anxiety response by practicing forms of relaxation, hypnosis, and biofeedback. As we've seen, however, muscle tension cannot be fully addressed by employing relaxation techniques that reduce specific tensions but fail to restore the proper coordination of the muscular system as a whole.

The second element in gaining control over the anxiety response is consciousness. We have seen that the stress response is a natural mechanism that functions in nature to protect us when we are in danger. This response, however, is often maladaptive. When faced with danger, many animals neither escape nor fight, but simply freeze or run out of control. Humans are particularly prone to becoming flustered and terror-stricken when faced with danger. Some performers become literally paralyzed with fear and unable to think rationally.

In order to address this response, it is necessary to learn to maintain a state of awareness and poise in whatever we are doing. Because many of us are not accustomed to handling stress, we become worried and distracted when put under pressure. We are also unaccustomed to the idea of paying attention to ourselves, preferring for the most part to engage in activities in which we lose ourselves and become distracted by outside influences. By learning to focus our attention constructively and to be kinesthetically aware when engaged in activity, we can prevent the stress response and remain poised in the most demanding circumstances.

Again, this type of awareness cannot be achieved by practicing relaxation techniques, which dull the consciousness by removing us from active participation in what we are doing. The same is true of hypnosis, which attempts to alter beliefs and to bring about deep

relaxation, but which achieves these results by inducing a sleeplike state. The key to overcoming performance anxiety is to learn to maintain a calm, alert awareness when going about one's activities and to then apply this experience to performance situations.

CHAPTER FIVE

The Role of Reaction in Skilled Performance

I would like to look now at the crucial role of reaction in skilled performance. We've seen that unwanted tension in action impedes smooth performance, and that this tension interferes with the natural working of the body in movement. In the case of the singer and violinist in our previous examples, for instance, the habit of tensing the neck and shoulder caused unnecessary strain in their performance. But, as we saw in the case of the flutist who could not control her responses, these tensions are part of a larger pattern of uncontrolled behavior. These behaviors have a profound effect—and often a harmful one—on the ability to master a complex skill.

1. The Subconscious Element in Action

To look in more detail at this problem of subconscious action, let's return to the case of Joan—the flutist who experienced shoulder and back tension and who came to me for help. We saw that when she raised the flute to play, Joan unnecessarily tensed her shoulder, trunk, and legs. In order to help her, it was necessary to reduce this tension by reorganizing the balance of her head and trunk, allowing the natural system to operate and lowering the overall amount of tension. The next step was to help her to *maintain* these improvements while performing a simple action such as standing or raising her arm.

Putting such an instruction into practice, however, is far more difficult than it first appears. In order to address this problem, I explained to Joan that I would like to demonstrate to her how she could move without unnecessarily tensing her neck and back, and that I would like her to remain sitting and to allow me to move her. However, instead of allowing me to orchestrate the movement so that it could take place in a new way, Joan ended up helping me by jumping out of the chair and creating the very tensions that she was trying to get rid of. Even when I asked her to remain sitting and not to perform the movement for me, she continued to jump up out of the chair and perform the action in precisely the same way as before. Joan was quite literally unable to control her actions and in trying to help me, she ended up performing precisely the actions she was being asked not to perform.

But why was Joan unable to control her actions? At first glance, her jumpiness appeared to be the result of worry and tension, since she was uneasy and wanted to be helpful. But her reaction was more than a knee-jerk response. Before moving her again, I explained to her that this time I did not want her to stand but only to come forward a few inches. Significantly, she did not jump out of the chair this time, but came forward only as far as I had suggested. In

other words, she moved not simply because she wanted to be helpful or because she was apprehensive, but because I had given her the idea of a movement, and this idea made her subconsciously anticipate my suggestion.

This connection of muscle tension with the idea to act was observable in a number of activities. When I asked Joan to keep her right arm relaxed by her side and then I quickly raised it, she was initially able to leave it alone. When I performed the action a second time, she was unable to refrain from moving it herself. The first time she did not know what I intended to do and so had no reason to anticipate my action. The second time, my suggestion gave her the idea of raising it, which caused her to move her arm even though she intended not to.

2. Ideomotor Action

But why do these ideas operate, and why are they subconscious? When we perform an action, we have a sense of autonomous control over the process, as if the mind is a kind of overseer that can dictate any action it likes. But most actions take place automatically and unthinkingly in response to associations we are constantly making during the course of our everyday activities.

To take an example, I am washing a pan in the kitchen, and once it is clean I find that I am rinsing it under the water, and then a moment later I am reaching for another dish. I do not know exactly how each movement occurred; each action is set off by the events prior to it, resulting in a series of acts that occur automatically and unconsciously. Furthermore, these actions are highly stereotyped and habitual. We have only to observe how we brush our teeth or wash our hands to realize how ritualized and automatic many of our actions have become. In spite of our sense of autonomy over our bodies, the vast majority of everyday activities are habitual, routinized actions which are largely unconscious.

This phenomenon, which was termed “ideomotor action” by William Carpenter, a nineteenth-century physiologist, is a basic mechanism of voluntary behavior.[1] We think of the mind as a kind of master that commands the body, and the body as its obedient servant. But the dominance of thought over action is not nearly so absolute as this, nor are the mental and physical components of action so clearly delineated from one another. Once there is an idea to do something, an entire pattern of response comes into play, at a level that is largely unconscious, and in a manner over which we have far less control than we realize.

The connection of ideas with motor acts, then, is how action is meant to take place and explains why we are susceptible to the idea of movement. We don’t perform actions because of a dominant will, but in response to associations we are constantly making, and this is

the basic mechanism governing voluntary action. If such a view were not true, how could we account for the remarkable fact that we can perform all the actions of everyday life so automatically? Washing our hands, walking to the store, cooking a meal—these are incredibly complex activities, and we couldn't possibly think about how we perform each and every one of them. We do them, in fact, unthinkingly and without any consciousness of their complexity.[2]

This connection of ideas and motor acts also explains why it was possible to trigger Joan into an action. We are designed to be sensitive to our own associations, so that in going through the activities of daily life we can efficiently and fluidly respond to circumstances. Normally, we respond not to suggestions that have been artificially given to us, but to our own associations in the context of daily life. But when an action was suggested to Joan in the teaching situation, the same mechanism was evoked, but in an artificial context.

3. Sensorimotor Pathways

Precisely because our actions occur not in response to an autonomous will but as preset pathways, we are limited in our ability to alter or improve our performance. Consider what happens when we perform the simple action of standing from a sitting position. Obviously we possess the capacity to stand or sit when we choose, and so regard this action as completely volitional. But what happens if we choose to perform the movement in a way that is contrary to our usual habit? Here we find that the very mechanism of voluntary action limits our freedom of choice. If, for instance, your manner of standing involves a tendency to arch the back, then no possible ideomotor pathway contains an alternative to this action; you must either refrain from doing the movement or else succumb to doing it the only way you know how.

Choosing an action, then, may serve our purposes when the chosen ideomotor pathway—such as wanting to get out of bed or walking to the phone—achieves our desired result. When we try to alter habitual actions, however, the ideomotor pathways are often *all* inadequate. Looked at in this way, the exercise of volitional control provides a kind of choice, but a limited one. In attempting to stand differently or to stand up straight, "choosing" one idea as opposed to another is not making any choice at all. The ideomotor process—*no matter what your intention or where you focus your awareness*—limits the demands of will. To exercise true choice, one must not simply "choose" among existing ideomotor pathways but ask the question how this ideomotor function—the reaction itself—can be made conscious.[3]

The ability to perform an action, then, involves a complex coordination of factors carried out by a preexisting mechanism and set in motion at a largely unconscious level. We normally assume that the mind sends directives to the body and that the body is capable of executing these orders. But the ideas that lead to motor

acts are carried out by a mechanism that, for better or worse, is limited by these preexisting pathways. We think that action emanates from a free will, but in fact it relies on the machinery of ideomotor action—a machinery comprised of specific sensorimotor coordinations that make particular ideomotor actions possible. If our intention is to change how action takes place, we are limited by these specific coordinations.

To reiterate, the whole notion of ideomotor function presupposes existing sensorimotor coordinations—coordinations that, in most cases, operate in the context of routine actions which function as habitual responses to stimuli. We can perform successfully only those actions that are the terminal point of established sensorimotor coordinations. Our ideas can evoke various motor responses precisely because the proper coordinations exist—coordinations that, like the working machinery of a car, can be ignored while we attend to driving but nevertheless must be present in order for the car to move at all. There is no overriding will and a body capable of executing its every demand. There is only a working machinery limited by preexisting sensorimotor coordinations and set into motion at a largely unconscious level. The operating elements of idea and motor activity are part of an inseparable whole.

4. The Role of Ideomotor Action in Skilled Performance

Let's look now at how this ideomotor function relates to skilled performance. To return to our earlier example of playing piano, let's say that the student is asked to play a series of notes at a very slow tempo. In this case, the manner of coordinating the hand and fingers will have little effect on the ability to hit each of the notes in turn, so long as they are played slowly enough. Even a complete novice, with little control over the use of the hand and fingers, will have little difficulty in accomplishing the task. The situation changes drastically if he now attempts to play the notes in quick succession. Here, the manner of using the hand and fingers will dramatically affect the outcome, since any unnecessary or habitual use of the hands and fingers will interfere with the ability to hit each note evenly and cleanly, and to execute the mental conception that must guide the entire process.

This is where the ideomotor function plays such an important role. When we perform a basic action such as playing a note on the piano, we of course assume that if we desire this particular outcome, our intention will ensure that outcome and no other. This sense of perfect control, however, is illusory. When asked to perform a task requiring great manual dexterity, or to play a complex series of notes in quick succession, we are simply not capable of executing the order. In this case, the hand must respond not to the keys but to the mental idea of what notes to play, and it must do so efficiently and economically. This is precisely what the hand cannot do if the idea of playing the notes invokes a pattern of action that is rushed, inefficient, and uncontrolled. If we respond habitually to a complex task, the performance will be impeded precisely by our intention to produce the outcome we desire.

The student believes that by making repeated conscious efforts to play the right notes, he will eventually succeed in mastering the difficult passage. But his actions are also reactions, habitual responses to the idea of playing the notes. If the total pattern of this response involves inefficient movements, or precludes the necessary coordination of motor act with mental conception, then the performance will be faulty. The very attempt to play the notes precludes intelligent action.

5. Breaking the Association

How then is it possible to break free of the associational process? To return to the example of standing without arching one's back, the student is likely to assume that if he tries to exert specific control over his movements, he will solve his problem. But since any intention—including the intention not to arch the back—will bring into play the ideomotor response, the student must first of all refrain from moving when the impulse to act comes to him. He must then perform a series of actions that result in the desired "end," without associating these new actions with the habitual act.

In order to help the student do this, the teacher must break the action down into discrete steps that do not associate with the finished act. In this way he can get the student to focus entirely on the components of the action and so avoid any association with the goal, or idea, of the finished act. For instance, the act of getting out of a chair can be broken down into the act of (1) hinging forward at the hips until the weight is over the feet, and (2) rising on the feet. Taken one step at a time, the finished act of standing can then be achieved without having thought of the end at all.

This process, however, is not simple. At first, the student will invariably associate coming forward from the hips with his habitual reaction of standing, usually because, in spite of himself, he is concerned with results, or because he is trying to "get it right"—in which case, he will end up "helping" the teacher by performing the entire act habitually. Underlying this tendency is the belief that if we do not actively focus on our goal, we will somehow lack the drive to achieve it. Here, the opposite is true. The teacher must demonstrate to the student that thinking of the "end" will guarantee failure; he must focus instead entirely on the "means." By learning to trust this process, the student will become less concerned about

performing the action “correctly” and will therefore be able to give his full attention to the elements that will ensure success.

When the student has mastered the first step—that is, learned to come forward from the hips without associating that movement with the act of standing—he is then ready to go on to the second step, adhering to the same principle, until he has completed the act of standing without having associated these actions with the habitual act of standing. Usually this experience is self-reinforcing: the student finds that he is able to achieve his goal without being directly concerned with it. The process, in other words, becomes more interesting to him than the “end” for which he is working. He soon learns to master the art of paying attention to how he performs an action without invoking the old idea that triggers the habitual act.

6. The Head-Torso Pattern as the Key

To retrace our steps, we have described ideomotor action as a motor act that is triggered by an idea. So long as the terminal points of ideomotor actions correspond to our desired goals, we have no reason to examine this process. But when we must master complex skills, or when we must alter harmful patterns of action—as in the case of Joan, who experienced harmful tensions while playing flute—it becomes a limiting factor and must come under increased conscious control. The phenomenon of ideomotor action then becomes a kind of trap. The student believes that, by retraining muscles or specifically trying to control what he is doing, he will be able to produce a new outcome. But any effort he makes brings into play the very habits he wants to overcome, and he finds himself repeating the very actions he wants to change. Even the idea of moving differently will bring about failure, since the idea to do anything—even when that idea represents an attempt to do something new—will evoke the old ideomotor response.

By becoming aware of the pattern of tensions associated with action, however, he can bring the ideomotor response under greater control. We saw earlier that ideomotor actions are the terminal point of a total process that involves muscular actions as well as mental ideas. In fact, we initially took interest in the ideomotor response precisely because we were trying to remove harmful tensions that interfered with performance. Without these tensions, the motor act could not happen, or at least not in the same way: the overt act is the result of muscular activity without which the action could not be accomplished. By becoming aware of these tensions and preventing them, the action itself comes under greater control.[4]

This isn't to say that by simply noticing muscular tensions we will immediately become capable of consciously controlling the ideomotor response. In fact, the idea to act will bring about a reversion to the old motor pattern, whether the coordination is

improved or not. However, the improvement in coordination provides a background against which, when the idea comes to act, the pattern of tensions can be perceived. The improvement in muscular coordination provides a basis for observing when the idea triggers the wrong motor activity. This makes it possible to perceive when the subconscious response occurs and to bring the ideomotor response under greater conscious control.

Now this seems to imply that we are not normally aware of what triggers the ideomotor function. And this is absolutely correct. Every now and then we pay conscious attention to an action we are about to perform—raising an arm or taking a few steps. But for the most part, we do not think about what specific movements we need to make; we are simply thinking all the time and, as a result of the play of ideas in our field of consciousness, actions happen without our knowing exactly how or at what moment. This is even more clearly the case in the example of triggering the ideomotor response in someone else: the student has no idea how the action happens, what triggered it, and may even have been consciously trying *not* to perform the action. He is simply unconscious of the associational process in the ideomotor chain, and of its role in evoking a motor response.

Kinesthetic awareness makes it possible to overcome this tendency. When we become aware of the muscular activity associated with the action, this kinesthetic feedback gives us a criterion for perceiving when the idea itself has begun to operate. We then become conscious of the ideomotor response itself and acquire a much greater degree of control over our actions. Our subjective sense of autonomy, we then realize, is highly deceptive and belies the fact that we are normally unaware of the process by which actions are subconsciously triggered by mental associations. When we become kinesthetically aware of the muscle tension that initiates these actions, it becomes possible to raise this subconscious process to the conscious level, giving us increased control over our performance.[5]

In Joan's case, for example, the habit of tightening her shoulder and holding her breath is initiated by her idea of playing the flute.

By making adjustments in her muscular system and then bringing her attention to this habit when she raises the instrument to her mouth, she can begin to detect and prevent this harmful pattern of tension. This makes it possible not only to eliminate tension but to learn to notice and to prevent the entire ideomotor response, replacing her unconscious action with a conscious, intelligently controlled one.

This increased control also makes it possible to replace a rushed and unintelligent response with a consciously thought-out action. The pianist had trouble executing the complex series of notes because his idea of playing invoked an uncoordinated and unconscious response. When he is able to notice this tendency, he is better able to prevent the automatic response and to consciously think through what notes he wants to play. He can coordinate his actions with greater control, organized as a new and intelligent conception, and is then able to play with less effort and greater clarity. He has realized the ultimate control in skill, which is to refrain from doing and to be completely quiet so that the action occurs as an intelligent response organized by one's intentions, not as an attempt to "get it right" or to succeed. Habitual reaction is replaced by conscious action in which the idea to play the notes can be more perfectly executed because it is organized by a clear conception.

This is not to say that awareness of action is the only way to achieve skill. On the contrary, animals are instinctively capable of highly skilled activity, which is what the ideomotor function evolved for in the first place. Many musicians become extremely accomplished precisely because they begin study at an early age and are therefore able to learn in almost the same way as animals—at an instinctive level. But in humans this motor function is interfered with and tends to become more and more unreliable over time. In order to master new skills—and to overcome persistent problems in learning—it is often necessary to raise the process of action to a more conscious level.

CHAPTER SIX

The Role of Habit in Skilled Performance

The role of defective action in skill is another essential element in bodily control as it applies to skilled performance. We've seen that the usual focus in learning skills is on attempting to reproduce the correct movements, with the goal of arriving at the perfect stroke or action. This attitude, in many people, amounts to a kind of obsession with perfecting desired actions, strengthening muscles, and drilling over and over again till the desired action becomes ingrained. But no amount of practice can overcome the harmful influence that the student's manner of doing exerts on his performance.

1. Defective Action and Its Role in Skilled Performance

To illustrate the problem, let's take the case of a novice tennis player who is learning to hit a backhand. When trying to swing at the ball, a beginner will typically raise the shoulder and throw the body backward while swinging awkwardly (Fig. 9). The result is that she slices the ball, hitting it wildly to one side. In this case it is clear that the tennis player has no real conception of how to hit a backhand, so the teacher will quite naturally want to help her by correcting her swing and teaching her how to step into the ball.

Fig. 9. *Defective action in the act of hitting a tennis ball. Notice how the player throws her weight backward while trying to transfer force into the ball.*

Although this approach will have limited success, it does not address the true nature of the tennis player's problem. We saw earlier that, when asked to perform very basic actions such as bending to pick something up off the floor or rising from a sitting position, the average person has a tendency to unnecessarily tighten and tense the body. If asked to bend down, for instance, most people, instead of bending at the knees and hips, will collapse the body at the waist, thus shortening and constricting the body.

This tendency is the real reason why the tennis player can't master the backhand stroke. The tennis player may attempt to correct her stroke by stepping into the ball, but even when she implements the teacher's specific instruction she throws her weight backward to do it—the opposite of what she needs to do in order to shift her weight properly. In spite of her best efforts, her swing remains substandard because her harmful way of performing actions is undermining her efforts. She cannot improve because her actions are defective.

What is worse, the student in this example, like the tennis teacher (who sees that his student's action is awkward but doesn't know why), has no consciousness of this defective action. And being unaware of the existence of such factors, she invariably assumes that *she has not yet learned the correct thing to do*. The teacher makes a similar assumption: he believes that he knows what his student needs to learn, and that his student's failure is due to a lack of talent or ability. The teacher will, in many cases, be so convinced of this fact that in spite of the repeated failure of his student he will continue to analyze and correct his student's game. He assumes that, whatever is wrong, if the right elements are pieced together, they will eventually come up with the right recipe—working on the swing, stepping into the ball, getting the racket back, and so on.

But this approach misses the point. The student's failure to progress is due to the uncoordinated way in which she implements

the teacher's instructions. This defective action is something she is positively doing no matter what specific corrections she is given by the teacher—in other words, the action is part of her habitual pattern of tensions. The teacher may decide that his student lacks talent, which is in some sense true. But the teacher doesn't have the knowledge necessary to properly analyze the student's problem. It is the teacher's understanding of the problem, not the student's level of ability, which is lacking.

In such cases, the tennis player's problems are often attributed to lack of talent or a general lack of coordination. But what we vaguely perceived as awkward movement and a lack of grace is just as specific a set of tensions as in the case of the singer. Because the tennis player is observed from a greater distance than the singer, we notice the overall quality of how the player moves through space, and not the details that we would notice in the singing lesson, such as pulling back the head—in other words, the movement of one part of the body in relation to another. This perhaps also accounts for why, although singing teachers are often aware of the role of habit in vocal production, tennis teachers rarely are except in a vague way. In fact, sports instructors in general aren't conscious that specific habits of "use" enter into the picture at all. But if we used a zoom lens and took a close-up view of the tennis player, we would see that she, too, created very definite tensions and made unnecessary movements like the singer.

This scenario is typical of hundreds of players who try to improve their game but cannot, even after years of playing. Over and over they attempt to correct specific elements of their game, without any real understanding of how their body works and how this affects their performance. Like so many athletes, they believe they simply haven't learned the correct actions, and continue to practice blindly with no appreciation for the underlying cause of their failure. They cannot find their way out of this trap by learning new skills because their difficulties are the result of something within themselves, a positively wrong manner of doing that must be corrected as the basis of all further efforts.

2. The “Expertise” Fallacy

The faulty assumption that it is the teacher’s job to convey positive know-how is compounded by the fact that most teachers of performing skills are deemed qualified to teach precisely because of their performing ability. They naturally assume that their students will be able to learn as they did—by following positive instructions on what to “do.” “Get the racket back,” the teacher exhorts his student as he continually hits the ball to him. “Step into the ball! Drop your shoulder!” he repeats *ad infinitum*.

But the premise on which this approach is based is fatally flawed. Like many professionals, the teacher may have been naturally gifted. This means that many of the predisposing habits necessary to his skill were intact, making it reasonably easy for him to learn and to implement *his* teacher’s instructions. But he cannot automatically assume that his own students will possess these predisposing characteristics; in fact, they may have harmful tendencies that he did not have. Instructions that were helpful to the teacher in his own learning simply don’t work for his students.

Let’s say, for example, that a voice teacher instructs his new student, who is having trouble producing a strong and supported tone, to “support from the abdomen.” Obviously the goal in such a situation is to help the student to achieve better vocal support by increasing the involvement of his abdominal muscles. But in many cases the teacher has based his assessment of the value of such an instruction on the condition of accomplished singers, including himself. For example, the teacher may have possessed in himself the proper freedom in the ribs and back which would make such an instruction successful. His student, however, may be slumped and too rigid in the ribs, and so the same instruction may be completely wrong for him and therefore of no benefit. Again, the teacher’s instructions are based on the faulty premise that the student is in a

position to benefit from his suggestions when in fact the student is positively blocked by his own habits.

In all likelihood, the teacher is unaware of the conditions that must be present in the student to ensure success. He is also unaware of the importance of preexisting habit, precisely because he never needed to consider it. This explains why, when he undertakes to teach someone, he will believe that the only factors to be taken into account are the ones that appear to be most immediately involved in learning the specific skill in question. When his student fails, he will have no idea why and will assume that the difficulty lies in his student's inability to implement his instructions properly. Nor does he realize that, if the student's predisposing condition is harmful, asking him to do *anything* is bound to invoke precisely those habits that will interfere and guarantee failure. Unfortunately, failure is too often what results.

This explains why even the most brilliant and talented singer, when asked what makes great singing, can be completely mistaken in analyzing his own actions and unable to teach others.[1] In fact, it is often the most natural and gifted performers who make the worst teachers, precisely because they never had to consider the various obstacles that stand in the way of the average learner. Possessing talent does not guarantee a knowledge of what is responsible for that talent. If the performer's physical condition deteriorates, or if he acquires the wrong habits with time, he will be no more able to correct his own habits, of which he is very likely unaware, than to correct those of others. The cases of such losses of skill are legion, and need hardly be cited.

Of course, teachers do recognize in some cases that the problem is in something that the student is doing, as did the voice teacher in the above example. But knowing that something is wrong and knowing *what* is wrong are two different things. We saw a moment ago that, when swinging her racket, the tennis player collapsed her body, arched her back, and raised her shoulder, all occurring as part of a total pattern of tension. The teacher may recognize one or another of these tendencies,[2] but unless he realizes that these specific faults are part of a larger pattern, he will not be able to

entirely remove them. This is why even those teachers who are conscious of specific habits will not be able to address problems stemming from these habits effectively. A working knowledge not just of specific habits but of the muscular system and how it functions as a whole is necessary for reasoning out how the learner can successfully overcome his difficulties.

3. The Role of Habit in Means and Ends

Let's turn now to the problem of trying to gain an end from the point of view of the role of habit in action. In our example of the tennis player who is trying to master a backhand stroke, we saw that both teacher and student viewed the end as something that could be gained simply by reproducing the correct physical actions. This is not an unreasonable way to view the process of performing routine actions, where we simply decide to do something and it happens. But in the context of learning a backhand in tennis, this approach often fails for the simple reason that the student is not capable of implementing the instruction.

The point is fundamental but easily overlooked: every act attempted by us is done by means of our selves. And this self involves a conglomeration of ingrained, persistent habits. Many teachers and students are only dimly aware of this fact, and don't realize that we do things by means of a mechanism that may be faulty.[3] As we saw in the previous discussion of ideomotor action, actions aren't magically accomplished by the "body," which obediently carries out the commands of the "mind" or Will, but by means of our habits.

Precisely because our habits operate unconsciously, however, we are not normally aware of them. If I choose to take a step, I don't have to think about how to do it but only about what I want to accomplish; the details take care of themselves. In performing such actions, the means already exist as preestablished habits, so that the desired choices are clearly available as overt end-products that I can choose like items on a grocery store shelf. Where simple actions are concerned we can, for all intents and purposes, think of ends as "things," which we can achieve without considering the means—taking a step, dusting a shelf, picking up the phone.

When the novice tennis player tries to swing her racket in a particular way, then, she's doing what we all do when we perform

routine, voluntary actions—namely, choosing her end as if it exists as a "thing" irrespective of her established habits. But given this habitual pattern of tensions, no attempt to learn the right "thing" can possibly result in success.

For instance, it would be ludicrous to believe that you could correct a faulty tennis swing while continuing to indulge in the habit of raising the shoulder; by definition a good swing in tennis means that the shoulder *doesn't* get hunched up. And yet this is often overlooked by both the student and teacher. The student attributes her failure to the fact that she has not yet learned to do the right thing. In fact, she cannot find the right swing because her habits constitute a positive hindrance to learning. In other words, hitting a winner down the base line (even though that event may seem to primarily involve aiming the ball with the right swing of the racket) is not external to our habits but is intimately tied up with them.

This issue also relates to the earlier discussion in this book regarding what particulars to attend to in skilled activity. We distinguished between two actions—reaching for a stationary glass, and catching the glass if it is moving quickly. We saw that reaching for the static object does require attention to the object and perceptual feedback to guide the arm. But in this case, such feedback need not be immediate or finely calibrated to the movement of the arm. In contrast, when we reach for the moving object, we must get immediate perceptual feedback as to where the object is and coordinate the movement of the arm with that feedback quickly and precisely. Reaching for the moving object, in other words, requires more precision in movement than reaching for the stationary object. Bodily coordination as well as perceptual adjustment are crucial to the performance.

Reaching for the stationary object presents no major difficulties, then, because even an uncoordinated or inebriated individual will be able to compensate for inaccurate movements and successfully grasp the object. In the case of the moving object, however, habitual defective movement may interfere with the successful performance of the act. In other words, in a simple, everyday action, poor

coordination is typically not an impediment to completing the task. The successful performance of the skilled act, on the other hand, is partly dependent on the correct bodily coordination; wrong actions will actively interfere with the process. This is why the skilled act appears to happen so effortlessly, and why effortlessness is an essential component: catching the ball is as much about what *not* to do as about what *to* do. As in the case of the tennis player, the ability to perform the act is not independent of but largely depends on established habit.

Bad habits do not exist in isolation; they are part and parcel of our very attempts at learning. To have a habit means in some sense to *act* habitually. When we gain control over habit, we gain control over the process of learning itself.

4. Achieving the End by Attending to the Means

To return to the question of how to reconstruct actions, how does the tennis player learn to swing the racket differently? Since her actions are defective, the student should give up entirely any direct attempt to perform the action correctly. Instead, she must reconstruct the proper movements step by step in order to indirectly arrive at her goal.

To put the process in terms of the role of habit in achieving "ends," the problem is this. The student's interest in the "end" brings about her habitual manner of doing, or "manner of use." This weds her to her old defective action. Concern with the end is therefore fatal to the attempt to master the correct action, and she must therefore give up her concern with the end and instead give her whole attention to the means, not simply by looking away from the "end," but by positively interesting herself in the specific elements comprising the completed act. By focusing on these intermediate "ends," she is able to circumvent her old habits and to act in a new way. In short, to achieve her goal, she must focus on the steps that indirectly result in its achievement.[4]

To put this process in practical terms, the tennis player's first step is to undergo the necessary readjustments that bring about the proper working of her body. She must then maintain this new state while she attends to the first basic component of swinging a racket —the overall position of her body—and then again to the next component—that of holding or raising the racket—and so on, until she is actually making contact with the ball when it is hit toward her. All the while, her attention must be constantly redirected toward the next tangible step in the process—the "end-in-view" as Dewey would call it—and diverted from her desired end-product, which must be patiently awaited as an indirect result of the

procedure. By familiarizing herself with this improved condition, she must learn to recognize when she has begun to revert back to her old pattern of tensions by paying attention to the process and not worrying about results.

The whole process hinges on the principle of stopping, which enables the student to hold her old habits in check, as the basis for positively implementing the means of achieving her end. The result is that the body is maintained, throughout the movement, in its proper organization. Usually the action is experienced as effortless (or at least more so than usual), and the student is able to undertake increasingly difficult tasks with more ease and confidence. The student has not been taught anything specific to do in the normal sense. She has analyzed and reconstructed her movements step by step while preventing the wrong habitual activity. She has focused largely on herself, not on swinging the racket correctly. And yet by preventing her harmful habits, she has gained a positive understanding of how to swing the racket.

To review, we saw earlier that eliminating harmful tensions facilitates performance, but does not provide positive knowledge of how to sing or play an instrument. But the reconstruction of action entailed in addressing the limitations of impeding habits implies a positive understanding of what to do, and *how* to do. If the study of the self in action appears not to address the question of how to perform actual skills—that is, if it does not satisfy the normal requirements for teaching a skill—this is precisely because such an approach challenges the validity of methods that give the student something directly to do.

I do not mean to suggest that, by applying these principles, the learner can somehow avoid having to learn all the details of performing. Nor is this to suggest that harmful habits are the only cause of the failure to learn since, as we've seen, many other elements—*e.g.*, talent, thinking and kinesthetic ability, mental attitude, and discipline—play a part in skill. But these technical aspects of performing should be subordinated to the principle of attending to the self in activity. The goal, the specific actions, must be the end-product of an intelligently worked-out procedure, subject

to a rational hierarchy of means and ends. The critical factor, all the while, must be conscious understanding and reason, not just blind attempts to do what seems “right.”

This element of habit, which I shall have more to say about in the examples to follow, is in my view the most crucial and underrated component in learning skills. An understanding of habit equips the student to address impeding obstacles and ensures continued growth and development. Ultimately, it gives the student a conscious command over the essential instrumentality upon which all learning depends—the self.

CHAPTER SEVEN

Non-Doing in Action

1. The Case of the Apprehensive Driver

We have now outlined the main points of the book. We saw first that in learning, far too much emphasis is placed on reproducing the correct actions, and not enough on experimenting and trying things out. The learner struggles to “get it right,” instead of stopping and giving himself a chance to learn by breaking the action down and thinking through the problem. Second, we saw that skill involves a number of perceptual components that are largely receptive. In hitting a ball, for instance, we do not just swing the bat, but must adjust the swing to meet the ball. Finally, we looked at the very crucial element of the role of the self in skilled performance, and the need to gain greater control over elements of the self in action. This is perhaps the most fundamental, as well as the most unrecognized, element of skill. I believe that an incorporation of this last element into our understanding of how we learn will lead to an entirely new approach to teaching skills. I would like to present, in these final chapters of the book, several examples in which we apply some of the elements we have discussed in earlier chapters to concrete cases.

I should point out that, in describing these case studies, I do not mean to present an exhaustive approach to any of the skills dealt with, which would require far more detail than is intended in this book. I would, however, like to illustrate how some of the principles discussed in this book might apply in actual learning situations.

Let's begin by revisiting the case of the driver who would like to learn to drive, but who is apprehensive and insists that she cannot succeed. As we saw, it is usual in a situation such as this for the teacher to put the student behind the wheel of a car and to ask her to drive and, when she exhibits signs of apprehension, to attempt to allay her fears by reassuring and supporting her. For most people this approach works, because the element of fear isn't overwhelming and the student is able to learn. For the apprehensive student this approach is disastrous because it places her in contact with the stimulus to fail and only perpetuates the cause of the problem. The teacher thinks he is providing useful support, but instead of addressing the student's problem, he reinforces it.

This problem is compounded by the teacher's enthusiasm to get across what he knows, his desire to correct what the student appears to be doing wrong, and his need to be reassuring and supportive. The teacher regards his task not as a process of helping the student to learn, but as one of correcting and showing her what to do "right." Virtually every suggestion the teacher makes will feed into the student's dilemma, and so will only be another reason for her to get upset. The teacher's effect, in other words, will be to reinforce the negative responses in the student by exposing her to precisely those stimuli that upset her. In the normal situation, the teacher's suggestions are likely to be helpful; but the apprehensive student interprets the teacher's suggestions as further cause for worry and as further distraction from constructive learning and attention.

It is therefore counterproductive for the teacher to be sensitive to the student while continuing to expose her to a stimulus that makes her upset and undermines her confidence. For this reason the teacher, far from giving instruction in driving, should *not* allow the student to drive. He will know that all students naturally have a destructive desire to leap headlong into the situation and that such a

response will only intensify any apprehension. He should also know that his major function is not to correct his student's actions, but to give her the opportunity to experiment and learn for herself. By building in a means of changing focus or interest, the teacher must remove the harmful influence of the situation, or at least give the student a chance to constructively deal with it.

But how does the teacher provide such a situation? First, the learning environment must be simplified as much as possible. Because many students have little difficulty learning to drive in normal traffic, it is easy for the teacher to assume that every student should learn in this context. But for the apprehensive student, a more logical approach is to first learn to handle the car in an empty parking lot, before being asked to drive on the streets.

Second, the student must then be asked to perform discrete tasks that remove all responsibility to drive "correctly," yet provide a positive learning experience. Anyone who has watched a new driver begin to panic at the wheel knows that, once the car picks up speed, the novice is bound to become flustered and out of control. The teacher must somehow remove this element from the equation. Since a car in idle will move by itself when in gear, this provides a kind of ready solution. The teacher can simply ask the student to place her foot on the brake and put the car into gear, and then to gradually release pressure on the brake and then press the brake down again. This, of course, will allow the car to roll forward (and bring it to a stop), giving the student the opportunity to learn to use the brake. However, the task is so structured that the student is relieved of any responsibility to "do" anything because she has not been asked to drive but simply to release and push the brake.

When the student is completely comfortable with using the brake, the teacher might then ask her to turn the wheel, without actually trying to steer the car, while it is moving. Again, because the process is so highly structured, the student has almost no cause for anxiety and, in a very short time, will find that she is able to steer the car comfortably while it is moving.

After becoming familiar with braking and steering, the student can then be asked to press the gas. This, too, can be done in steps,

by first asking her to press the gas and notice what the car does in response; to press the gas and turn the steering wheel; and finally, to drive around the parking lot and steer in any direction she chooses. Our novice is now truly driving, even though she has not actually conceived it this way because she has arrived at this stage in discrete and controlled steps.

Notice that, until now, the student has had no cause for worry because she has been able to learn in manageable steps. Normally, we set up learning situations to allow failure, on the assumption that the student will learn in spite of initial fears. If this doesn't work, we know no other way to help the learner except to provide guidance and emotional support. In such cases, many teachers do not know how to recognize when a student is truly frightened, and therefore see no reason to alter or question their method of teaching. The apprehensive student, however, requires a knowledgeable teacher who presents the elements of learning in clearly defined steps. By being provided with a situation in which all responsibility is lifted from her, she is able to master the discrete elements of handling the car—braking, steering, and accelerating—with complete freedom and confidence. The key to this process is not simply emotional support, but a structured learning environment.

Providing this structure, however, requires ingenuity and clarity. The teacher must help the student through every phase of the process, even to the point of giving precise instructions for each step. To an outside observer, and even to the student, this approach may initially seem rigid or controlling, but it is in fact necessary because it gives the student the freedom and structure to make discoveries she could not otherwise make. Because this process is so highly structured, the student has almost no cause for anxiety: she has nothing to get right and therefore nothing that might go wrong. At the same time, she is also free to learn exactly what she needs to learn, and to build the confidence she needs for actually driving.

The next step is to present the student with a task that does evoke anxiety—for instance, parallel parking or driving in traffic. In the case of parallel parking, the teacher knows that in attempting to

back into the space, the student is bound to get flustered at the point that she has to judge when to turn the car, or when to reverse direction as she backs into the space. If she does get flustered, it is the teacher's job to recognize this problem and to stop her immediately. Although the student may not fully understand exactly why she should stop and may even resist the suggestion, the teacher must insist, explaining that the reason for stopping will become clearer as they progress.

The teacher might at this point ask the student to get out of the car and, after observing the way the wheels are turned, to decide what needs to happen next. When she tries out her idea, the student may again become flustered, but she will soon see that, by stopping her midway in the act of parking, the teacher is breaking down the task and forcing her to think through each step before becoming confused or panicked. This frees her from concern about results and makes it possible to think about what action should be taken before being forced to react under pressure. In short, the act of stopping has made it possible to break the problem down into manageable steps, before the student becomes overwhelmed by her own reaction to the situation.

This necessity for stopping at the teacher's request is the final crucial element in teaching the apprehensive student. The student must be given the experience of stopping, so that she is not allowed to take on the responsibility that causes the problem, and therefore *can't* get worried because she is no longer driving. As opposed to a calm and balanced student, the driver is in an emotional state that makes her unwilling to accept the situation and approach it calmly; she insists on trying, even when this approach leads time and again to total frustration. Paradoxical as it may seem, she may even insist on trying repeatedly, even though it is this very attitude that leads to failure. In this sense, she is her own worst enemy, since her fear makes her insist on doing the very things that cause her to fail.

Being asked to stop is the perfect antidote to this tendency. The moment the teacher observes his student becoming fearful, he prevents her from trying to do the very thing that causes her to panic. In this way, the teacher helps her to patiently approach the

various stages of driving in a simple and manageable way, while also teaching her to gain greater control over her reactions.

Before the student realizes it has happened, she will find that she has become fairly adept at maneuvering the car and even excited by the prospect of another challenge. Chances are she will continue to get flustered at times, in which case the teacher will need to remind her to stop. But as long as she recognizes the problem and addresses it by stopping, her confidence will increase until she has mastered not only the elements of maneuvering the car, but driving in traffic and under more demanding circumstances.

What is remarkable about this method of teaching is that it requires virtually no "teaching" in the usual sense of the word. In the traditional approach, the teacher coaches and coaxes the student, telling her what to do and correcting her when she is wrong; the structured situation, by contrast, seems rigid. But as we've seen, being supportive and giving constant instruction does not actually give the apprehensive driver—and sometimes the calmer student as well—the opportunity to discover what she needs to know, because she has not been provided the structure within which real learning can take place. Without having received any instructions about driving *per se*, our student is able to learn everything she needs to know; structuring the learning situation is in fact educationally liberating and truly respectful of her own learning process.

2. The Tennis Player

Observing versus Doing

Let us now revisit the case of the novice tennis player who is trying to learn to hit a backhand, but who slices the ball wildly to the side because she has a tendency to throw her body backward every time she strokes the racket. Thinking that she does not know the proper way to execute the stroke, the novice has sought out an expert who demonstrates to her how to bring the racket back, how to swing, and so on. The teacher asks her to stroke the racket, makes corrections, and then, as he hits the ball to her over and over from the other end of court, reminds her to get the racket back, to follow through, and so on. As we've seen, however, the student cannot make any progress because she continues to slice the ball in the usual uncontrolled manner. She is so wedded to her old way of performing the action—and so unaware of the futility of her own attempts—that she must first observe what she is doing and learn to stop it before she can learn a new way.

In *The Inner Game of Tennis*[1] Timothy Gallwey describes this problem in an amusing anecdote. He is consulted by a corporate executive who has been having a great deal of trouble with his backhand. Five pros, the man explains to Gallwey, have told him that he raises his arm too high when he takes it back, but in spite of their advice he has not been able to lower his arm and is very distressed about the problem. The situation, Gallwey says, is inexplicable. Here is a man who runs huge corporations, and yet he says he cannot control his own right arm. If he knows he is raising his arm, why does he not simply lower it?

The reason, as Gallwey points out in his book, is so obvious that it is often overlooked. It's not that the man cannot put his arm down; like the driver in the previous example, his *capacity* to move his arm this way or that is not in question. The problem is that he does not

really *know* the arm is raised too high and therefore cannot stop doing it. We know this because when the man was asked to observe himself in a mirror, he was surprised to find his arm raised, which proved that, although he understood intellectually what he was doing, he did not know it in the sense of having experienced it for himself. Until he was able to find out—find out in the sense of actually seeing it for himself—he was not able to exercise choice because the choice did not exist.

The first step in correcting something we are doing wrong, then, is to *see* what we are doing. If you were trying to sew a button on a shirt but were sitting in the dark, you wouldn't attribute your difficulty to your failure to do the right thing. This is, in effect, the position the tennis player is in. She is having trouble hitting the ball, but instead of giving herself an opportunity to see what she is doing, she relies instead on an idea, or imitation, of a correct or "proper" stroke, and criticizes herself for not being able to execute this stroke. The solution, as Gallwey points out, is for the student to look at what she *is* doing.

Observing what we are doing while we are doing it, however, is not easy, because so much is happening when we swing the tennis racket that it is hard to notice particulars. In order for the student to be able to observe, the teacher must simplify the situation. In the present case of a wayward backhand, a possible approach would be to ask the student to bounce the ball against a backboard, to get ready to hit the ball as it comes back, and then to observe where her racket is when the ball hits it—not to change it, simply to observe the racket face as it makes contact with the ball. Is the racket raised and slanted when the ball hits it, or flat to the ball? Is the ball hitting the center of the strings, or does it hit the sides? When the student in this way shifts her attention from trying to get things right, and focuses instead on what she *is* doing, she will for the first time experience not the judgment that something is wrong (which only makes her try harder), but the actual fact of what she is doing and how it affects the contact of her racket with the ball. Very soon afterwards—assuming she does not immediately degenerate into her old attitude of trying to do what she thinks is the right stroke—she

will find that the racket will “right” itself, and that she has found out how to make a firm contact with the ball.

The difficulty in doing this, for most of us, is that we are judgmental and cannot simply notice something that is wrong precisely because we view it *as* wrong. The student must learn to notice what she is doing without judging it. This makes it possible for the correction to take place naturally—not because she has been taught something new to do (she hasn’t been taught anything at all in the usual sense of the word), but because by seeing what she is doing she will respond intelligently and make the correction. Finding a new angle for the racket happens in response to the process of observing.

We saw earlier that all skills—including swinging a racket—involve a receptive component, a process of learning to observe and accommodate according to our perceptions, as well as to willfully execute actions. The act of stopping and examining what she is doing enables the student to get in touch with this element of her tennis swing. This is not to say that the tennis player doesn’t have other elements to learn, including how to hit the ball (which we will look at in a moment). But she is often unaware that the first difficulty is not knowing what she is doing. Once she stops to observe, she may find that her problem dissolves. Being told what to do by the teacher, then, is a questionable approach, for the simple reason that it doesn’t address the student’s problem. The student must first change her attitude so that she stops repeating what she thinks is right and can be open to learning something new.

As we can see, this is a departure from the usual focus of teaching (at least in the realm of athletics), since it discredits the teacher’s traditional function of assessing what is wrong and making corrections. This does not mean that *all* instructions are wrong. Sometimes a small correction can be just what the student requires. All too often, however, the teacher’s instructions divert the student from the fact of what she is doing and therefore contribute to her failure. I said earlier that the problem is that the student does not know what she is doing. This isn’t the whole problem, because if she *knew* that she didn’t know, she would probably be motivated to find

out. Like most students, however, she thinks she *does* know, and so does not bother to actually look for herself. It is partly the teacher who is responsible for this, because it is the teacher who has told her what is wrong and fed her belief that she knows what is wrong and preempted her finding out for herself. Objective criticisms, then, often reinforce the student's desire to get things right, her preoccupation with results, and her inability to learn for herself. As in all forms of learning, the teacher's suggestions can be more harmful than helpful, which is why the teacher must make them sparingly and, as a primary objective, get the student to actually learn for herself.

When one considers, too, that the student is far from naive and has active tendencies to indulge in all sorts of futile efforts, then the importance of not feeding this tendency becomes even clearer. The student is not only constantly judging herself with ideas as to what is right and wrong; she has, as it were, an active tendency to do the wrong thing. What is even more fascinating is that, if you ask her to observe what she is doing, her desire to "do," to get onto the court and "try," is so powerful that, in some cases, she will be openly hostile to the idea of stopping. It simply feels better to try to do something new to correct her stroke than to understand what she *is* doing.

But why doesn't the teacher recognize that showing his student what to do is not working? When his student's stroke does not improve, he assumes that more corrections need to be made, and writes further failures off to lack of talent or lack of practice. The relative failure of the teacher's method, then, has little effect on his convictions about his approach. Once the teacher works within the context of making corrections, the student's very failure seems to justify the need for further help from the teacher, thus making the approach self-perpetuating.

Conventional teaching methods, then, may be useful insofar as they tell us what is in fact objectively wrong, but they fail to "meet" the student's problem and distract her from attending to those things that can help her. Her attempts at learning bypass her ability to perceive what she is in fact doing—a process that is essential to

making the changes that an objective observer knows she must make. When we open up the field of actual perception and become aware of what we are doing, we see that the answer to our difficulty —and the role of the teacher—lies not in figuring out what is wrong and telling the student what to correct, but in seeing what we are doing. The student finds a solution to her problem, not through the expected channels of trying to imitate or master what she has been told, but by seeing for herself, which is simpler and more fun than the usual rote learning.

Getting the Principle

In the last section we saw that when the student tried to hit a backhand, she had no way of seeing what she was actually doing with her racket, so that in spite of her efforts to correct her stroke she could not make any real change. Instead of trying to correct what she was doing, it was necessary for her to take time to observe her racket face as it met the ball, which presented her with a solution.

Let's turn now to the problem of hitting the ball. Up till now, the student has of course tried to hit the ball based on the idea that she should swing at it, with mostly negative results. The assumption that stroking the racket will make the ball go forward is, for most people, so basic that it is taken for granted. The main problem, of course, is to make sure to hit the ball, and to hit it solidly. But we saw that in the present case of our novice player, her swing was somehow compromised by her tendency to throw her weight backward. This defective action was connected with a wrong idea of where the racket face was so that, instead of hitting the ball squarely, she sliced at it. Clearly the act of swinging must somehow be avoided—at least for the time being—so that she will not indulge in these harmful actions.

But how does one hit the ball without swinging at it? One way to do this is to have the student approach the task of hitting in an experimental way—not to achieve something, but simply to learn about how one uses the racket to propel the ball. So far, the student

has learned to stop the forward motion of the ball with her racket, allowing it to bounce off the racket without being propelled forward. The teacher might then ask the student to observe what it is that makes the ball move—not what she believes is doing it, but to observe what actually makes it move. When she swings in the usual way, she does not have a clear idea of where the racket face is, and cannot therefore hit the ball squarely. Because she now has a sense of how to make contact with the ball, hitting the ball becomes a relatively simple matter. If she keeps the racket as it is but simply shifts her weight when the ball hits her racket, she can now solidly punch the ball, propelling it forward a few feet. After a few minutes of this, she will get the "feel" of this static backhand and, still standing a few feet from the backboard, will be able to hit the ball consistently against the wall.

The most important element in this process is that the student must be prevented from doing what she thinks is right—that is, swinging the racket as she understands it—because this will only make her repeat her usual movements, robbing her of the chance to discover anything new. By experimenting in this way, without trying to swing the racket or hit the ball as she normally does, she finds that there is a natural movement which propels the ball forward: shifting her weight.

By learning where the racket face is and therefore being able to block the ball, and by learning to move the ball while staying in touch with the racket face, our student has learned to hit the ball. She has not been taught what to do or shown a series of movements. She has also not been corrected by being told to step into the ball, to take the racket back, or given any other specific instruction. Through the process of studying her own actions, observing how to contact the ball in a direct way, and then discovering how to move the ball by shifting her weight, she has found out for herself the simplest way—or certainly one of the simplest ways—to hit the ball.

The principle she has discovered is this: By shifting her body weight as she blocks the ball, she transfers her momentum into the racket. She isn't hitting the ball by moving her racket; rather, her racket moves as an extension of her body, so that she is using the

racket as a surface for transferring the force created by the momentum of her own body. In effect, she is moving the ball by shifting her weight.

Simple as this sounds, though, most tennis students have never observed this fundamental principle, which is basic to many sports. I said a moment ago that, although the student believed she knew how to hit a ball, she was in fact unclear about what is actually involved in this simple and familiar act. Now, however, she has begun to discover just what it is that she is trying to do, not only from the point of view of the end she would like to achieve, but exactly what she must do in order to achieve that end.

To digress for a moment, it is worth pointing out that this principle generalizes not only to other sports but also to many basic everyday physical activities. It is surprising how little common sense the average person displays in performing even the simplest activities of lifting objects, handling tools and instruments, and so on. For most people, the desire to get the job done makes them rush and strain, obliterating any chance of utilizing the basic mechanical principles governing objects and how they work. If we took a moment to choose the right tool or to think about how to perform a particular motion, we could lift the chair more easily, hammer the nail with less effort, or strain less to turn the screwdriver. By observation and experimentation we can learn to get the maximum leverage, use a tool in the way that it is designed to be used, or move a heavy piece of furniture with relative ease. Instead, like the tennis player trying to improve her stroke, we approach activities with determined effort but, unfortunately, not too much thought.

The tennis player might of course object to this analysis on the grounds that, when she tries different ways of swinging the racket at the ball in order to get the desired spin and control, she *is* experimenting. She has also formed a fairly clear visual picture of what the various strokes are like and so, based on past experience and watching others, believes she knows something about how to hit a ball. But her efforts have been directed mainly at learning to do what her teacher or others have shown her. The truth is that she has never really understood what it is she actually does—or must do

—in order to hit the ball; and she doesn't know that she doesn't know.

The teacher, as we've seen, only complicates this situation. Knowing how to hit the ball effectively, he is mainly concerned to demonstrate the correct stroke to his student and to point out what she is doing wrong against his model of what he knows is correct. He therefore continues to make corrections to her actions, which she, as the student, blindly accepts. But the actual effect of his instructions is to make his student completely preoccupied with doing the right thing, which only distracts her from learning. During this whole process, not once does the teacher explain—or even better, let his student discover—what it is exactly she is trying to do. (In fact, if you asked him, he probably wouldn't know himself, since he very likely learned by instinct.) She must be given an opportunity to experiment and therefore to see for herself how to produce the results she wants.

Once the student has understood the basic principle of body shift underlying hitting the ball, she is ready to apply it to the more complicated problem of learning a full backhand stroke. For instance, if she continues the same motion as before, but steps a little further away from the wall, and doesn't simply hold the racket out, but holds it a little back and then moves it to meet the ball, she will find that she is now able to hit the ball. She has transformed the simple shift of weight into a much more powerful force by coordinating it with the swing.

The logic of the arm movement thus grows out of the logic of how the arm must coordinate with the body to transfer the momentum of the body to the ball. The arm motion is, in truth, only the most obvious aspect of this larger movement. As before, the hitting is still based on the shifting of the body weight, except that the weight shift is now coordinated with the swing of the arm in order to transfer the body weight into the ball.

It is true that the full stroke is more complicated, and in this sense more difficult to "do," than the earlier simple weight shift. Yet the fully developed skill of swinging a tennis racket does not work on a different principle than the first simplified step, but is a variation of

the same. At each stage, the student must refrain from trying to “do” the stroke, or else she will only repeat her old tendency and preempt any new discovery. In order to arrive at a new way of hitting the ball, she must be given the opportunity to observe and reconstruct the process of hitting.

When the student is given a chance to experiment with how she propels the ball, she then learns that there is no “correct” stroke to be performed as an isolated motion; rather, the movement we call a good stroke is one that coordinates with the body movement to produce an effective result. She isn’t “doing” this motion, which is the “right” one; rather, when she makes a graceful and skillful stroke in tennis, it is because she has discovered what works as a total coordinated activity. The student now understands that she hits the ball not by “capturing” the right movement, but by discovering what works out of true experimentation and observation.

I do not mean to suggest that this is the only way of hitting the ball. In some cases—particularly in the case of learning to swing a baseball bat or a golf club—beginning by swinging the arms and then adding the weight shift (the opposite of what we have done here) is often useful. Being placed in a confining and baffling batter’s or golfer’s stance, in fact, is a big problem for novices in these sports, who would do well to explore swinging the bat or golf club freely, and then discovering the stance secondarily. My point is that the teacher and the student should be experimental and open to whatever works. Nor does every student need to break the stroke down in such detail. But when instinct fails, the student must be given the opportunity to experiment and to reconstruct the process of hitting so that she can discover what works.

In this way the student not only can give up blindly trying, but she has a positive new understanding that helps her to actively replace her old strategies, which in comparison to her new approach become weak and unsatisfying. She also no longer imitates others, but understands what is required to achieve the result she wants. She discovers that the proper stroke is the result of a process, and in

grasping this process, she gains not just in ability but in understanding as well.

The Control of Movement

Let us now turn to the final element of the tennis swing—namely, the control of movement. We've seen that, for the beginner who is having difficulty swinging her racket, it is possible to hit the ball not by employing the swinging motion, but by using the momentum of the body. This enabled our student to substitute a simple weight shift for her usual swinging action, which was associated with a tendency to throw her body backward and to shorten in stature. As a final step, let us consider the process of replacing her defective motions with a properly coordinated act of using her weight to swing the racket.

If you ask someone to swing a bat or throw a ball, you'll see that in order to swing or throw vigorously, he will instinctively prepare for the movement by widening his stance and lowering his body. This prepares him to shift his weight, so that he can use the momentum of his body to convey force to the ball. Close observation reveals, however, that although some people can execute this movement fairly well, most people perform the action deplorably. As soon as they bend their knees, they slump, sometimes to a marked extent, as well as twist noticeably to one side. Sometimes they do not bring the trunk forward from the hips but back and down, so that they are unable to shift their weight at all. It is not uncommon for a person to do something entirely different than bend at the knees. In the case of the tennis player, the body was thrown backward in order to swing at the ball—exactly the opposite of what she intended (see Fig. 9).

The reason for these harmful actions, as we've seen, is the pattern of tension that interferes with the body's natural mechanism of support. When bending at the knees, most people will collapse the body by pulling back the head, arching the back, and making other unnecessary tensions. In order to counter these tendencies, the student must learn, with the help of a skilled teacher, to maintain

the length and support of the body while at the same time bending at the knees and inclining forward at the hips.

This new, coordinated working of the muscular system provides such a marked improvement in action that, even to a casual observer, its athletic advantages are immediately apparent. Instead of being thrown backward, the body seems to be lightly supported over the feet, making it possible to shift the weight, to twist or spiral the body, and to change directions far more easily and with much greater skill.

This action of coordinating total body movements is basic to all sports (Fig. 10), but it is virtually ignored in athletic instruction because such instruction focuses on the specific voluntary actions involved in skill and not on general poise and coordination of body movement. When hitting a tennis ball, for instance, most people are conscious of swinging the racket, but largely unconscious of the position they assume in order to accomplish this act. Yet the success of the swing largely depends on the ability to use the entire body efficiently. Just by observing the student's preparatory stance, in fact, a skilled teacher can tell whether the swing will be effective or not.

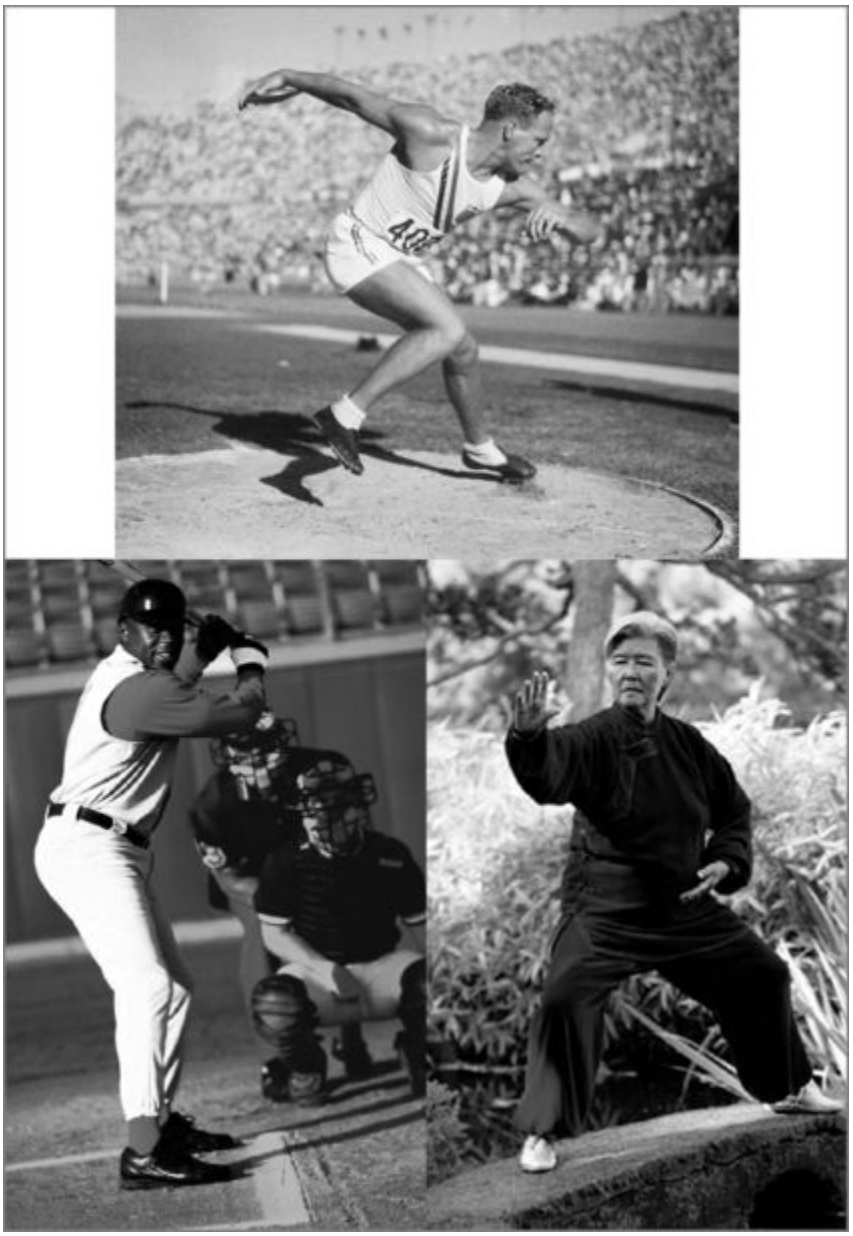

Fig. 10. *Athletes in coordinated crouching positions that increase their balance and ability to shift weight.*

This emphasis on the voluntary elements of skill corresponds largely to the fact that the specific act of swinging is associated with a voluntary movement, and the larger stance a reflex position. As we saw in the chapter on “The Elements of Skill,” we are generally far more conscious of the voluntary than of the reflex component of

action—that is to say, of the specific component of the action and not the general support that constitutes the necessary background upon which all specific action depends. Yet the general reflex component is absolutely crucial to success in swinging the racket.

The same can also be said for the sitting posture, which is as critical to fine motor skills as a proper stance is to athletic skills. When performing complex fine motor actions while sitting (as in writing or playing an instrument), we normally focus on the use of the arm and hands and disregard the role of the back and legs. Although the use of the arm and hand is entirely dependent on the working of the total system, few people ever actually study sitting balance or consider it except in a cursory way.

Because the role of bodily poise is neglected in most Western skills, natural coordination is rarely seen in adults, who tend to lose this quality with time. In martial arts, a great deal of attention is paid to the general posture on which kicking and punching are based, prior to learning how to kick and punch. This makes the process of learning a martial art much more conscious and detailed than that of most athletics, where general body usage is largely ignored—and the execution of the actions involved mostly unconscious—with the exception of a few sports. A rare example of natural poise in Western art forms is the dancing of Fred Astaire, who even as a middle-aged man still moved effortlessly and with a remarkable lightness and grace. The great majority of people, however, lack such natural poise, and can regain it only by restoring the body's natural support system.

Once the student has mastered the basic action of bending in a coordinated way, she then must apply this position to the process of swinging the racket as the ball is hit to her. Learning to coordinate herself in this new way when faced with the challenge of swinging the racket, however, is a difficult step, since her old tendencies will come into play once she is thinking about hitting the ball. The difficulty here, as we discussed earlier, is that once we are presented with the stimulus of hitting the ball, or even asked to hold the racket, we tend to revert to our old way of performing the action. The student must assiduously avoid the old idea of how to perform

the movement, putting aside the desire to do it as she has always done it, while focusing on coordinating herself in a new way as she prepares to perform the act.

When the student is able to maintain this new coordination while swinging the racket, she will find that she has gained total control over many of the elements necessary to swinging the racket: shifting her weight, twisting and turning, and lowering and moving her body freely. Hitting the ball will take less effort than before, yet she will be able to apply greater force to the ball and focus her energies with more precision. She will also understand how to improve further, not by drilling and forcing herself to try harder, but by examining how she is hitting the ball, and thinking about the process of what she is trying to do. She will have gained greater mastery of the sport and, more importantly, increased control over her own actions.

The final element in learning to hit the ball, then, is the control of the body—in this case, knowing how to bend and shift weight, to spiral and to torque the body freely. To retrace our steps, we saw how the student began with the idea that there was a proper stroke that she must figure out how to "do"; the teacher, on his side, tried to show the student what it was. But trying to imitate the proper stroke was a futile endeavor. It was necessary for the student to find out how to propel the ball by shifting her weight, discovering in the process what she needed to do to stroke the racket effectively.

But she has now seen that she cannot execute the required movements properly. She was unaware not only of what she was trying to do, but also of the faulty movements that were part and parcel of her efforts. Her inability to hit a tennis ball properly, then, was a manifestation of the incorrect coordination that has become the norm for most people who, when asked to perform even the simplest movement, will interfere with the body's natural poise.

Beginning with the practical problem of how to hit a tennis ball, we have now traced the student's problem to her defective actions. There is no correct way to hit the ball; stroking the racket depends upon established habit. In practical terms, this means, among other things, that the student must master the basic movement governing

her weight shift, as a fundamental gesture necessary to any specific act.

As we have seen, this throws into question the usual assumptions in teaching. Most teachers think their students can achieve the proper stroke by reproducing the correct movement; if the student fails, the teacher's role is to make corrections. He is mainly concerned with whether the student is "getting it right," not whether the student's mode of action is itself reliable and efficient. The reason for this omission is that few athletes and performers—not to mention those of us who do not have a professional interest in how the body functions—appreciate the significance of bodily control in learning. With the exception of a few martial artists and musicians who have given attention to body posture, most of us use the various positions and coordinations basic to living and performance unconsciously. Few people, in fact, are aware of this element of bodily coordination because their focus—even when learning a sport or a musical instrument—is on achieving their ends, on doing the "right" thing.

As the example of the tennis student shows, however, the proper swing is partly constituted by general coordination and cannot be executed as an isolated movement that can be mechanically learned and repeated. The single most important element in mastering a particular skill is not the specific actions required, but the proper command of the body as the instrumentality upon which all specific action depends.

CHAPTER EIGHT

High-Level Skills and the Art of Non-Doing

1. The Singer's Breath

As a demonstration of the principle of non-doing in highly skilled performance, let us turn now to musical skill, beginning with breathing and the art of singing. All singers, at one time or another, must pay attention to their breathing, since it is the air flowing out of the lungs that vibrates the vocal cords and therefore forms the basis for the sung tone. Many schools of singing advocate specific breathing exercises in the belief that breathing can be improved and strengthened; other schools focus instead on vocal techniques designed at indirectly improving breathing, relying on vocal drills and exercises. Breathing efficiently, however, requires neither exercises nor drills, because it is a natural function that, when understood properly, happens effortlessly. It forms the basis for completely natural vocal production—a subject I would now like to turn to.

We saw earlier that many singers, when preparing to sing a phrase, take breath by gasping in air and arching the back, using far too much tension and interfering with the natural process of

breathing. These actions, we saw, were symptomatic of general tendencies during speech and movement to make unnecessary movements of rib cage, chest, back, and head. It is not entirely self-evident, even to voice teachers, why such habits are harmful, but all of these movements are in fact detrimental to the natural process upon which breathing depends.

Breathing occurs on the principle of the bellows. When a bellows is opened, air is not sucked in, but rushes in to fill the vacuum that has been created; when the bellows is closed, the air is forced out. The bellows is the ribs and diaphragm. The raising and widening of the ribs and the contraction (lowering) of the diaphragm "opens" the bellows. The relaxation of the diaphragm to its domed (raised) position and the recoil of the elastic walls of the ribs to their normal size "closes" it. Of course, the rib cage, unlike a bellows, is never fully closed, but in the same way that air flows into and out of a bellows when it is opened and closed, air flows into and out of the lungs when we increase and decrease the size of our rib cage.

Understanding this basic principle is essential to good vocal use. Nature has constructed us in such a way that in order to breathe normally, we do not *do* anything to the air; it simply comes in and out through the nostrils and mouth as an indirect result of the fact that our bodies automatically increase and then decrease the space inside our chest cavities. This means that the quality of breathing depends on whether the bellows is working properly—on its not being distorted in shape, and its opening and closing fully. If we want to breathe well, we do not need to do anything to get air into the body, but simply to secure the coordinated, reflexive working of the system on which the movements of breathing depend.[1]

This is where our habitual tensions come into play. When we interfere with our natural support by tightening the neck muscles, pulling back the head, raising the chest, and narrowing the back, then the ribs will not fully expand and contract. On the other hand, when we restore the lengthened support of the body, the ribs can move freely and the bellows can open and close properly. The breathing, in other words, will operate to best advantage when we are properly coordinated in an overall sense.

The first prerequisite in educating the singer in proper vocalizing, then, is to restore the conditions of coordination in the torso and body that allow breathing to occur naturally and easily. In order to breathe properly, the singer does not have to involve himself in any direct attempts to improve his breathing, since the whole point is that the flow of breath occurs entirely as a result of the natural support of the body. In fact, such concern will only complicate matters, since it will invoke the wrong tensions that interfere with this natural support.

But how is this coordinated "use" to be applied to singing or vocalization? The most obvious solution seems to be to make sure to leave the breathing alone—that is, maintain the improved conditions—while vocalizing. This is in fact the theory on which most vocal and breathing exercises are based. In practice it is not so simple. The moment the student thinks of leaving himself relaxed *during vocalization or while breathing*, he invariably brings into play the wrong habits.

The reason for this oversight is that the singer does not connect the muscular condition of his body with what he is doing in action. Breathing is a result, a natural effect, of the bellows-like movements of the ribs. Air comes in and out of the lungs purely due to reflex expansions and contractions of the ribs, whose working depends in turn on the lengthened support of the trunk. But *thinking* about breathing or vocalizing (as the singer must) is another matter entirely. The singer then sucks in air and pushes it out by gasping, arching his back, and interfering with the bellows. In other words, anything he does that involves the choice, the decision, to breathe or speak—even when he is trying *not* to tense his body—activates the wrong habits associated with breathing and vocalizing and thus brings into play the wrong movements.

We saw in the section on ideomotor action that the idea to do something leads to a motor response invoking the habitual pattern of tensions. This is precisely the singer's problem. The intention to perform the action—even when that intention involves a desire to perform it correctly—invokes the very habits that interfere with

breathing. Concern about breathing actually violates the principles on which breathing is based.

The persistence of such harmful habits when we speak or sing can be easily observed, and it is what complicates the matter of improving the singer's breathing. It is comparatively simple to improve his breathing by making changes in his coordination; he can feel the increased freedom in his back, chest, ribs, and diaphragm, and he can see how easily the air comes in and out as a result. As soon as he begins to vocalize, however, he at once brings into play these wrong habits. In spite of whatever improvements he has made, the fundamental cause of his problem remains untouched.

This is why methods that strive to achieve releases and "freeing" in the breathing do not address the underlying cause of inadequate breathing, even though they appear to. Vocal exercises may temporarily improve the breathing or invigorate the tissues by bringing about some specific improvement in the movements of ribs and diaphragm. But ultimately they can only interfere with the process. Whatever specific results are achieved, the very fact of doing an exercise or breathing in a particular manner is itself an ideomotor stimulus bringing into play the very tensions that disturb the natural expansions and contractions and therefore the breathing. Most likely such approaches are not based on an understanding of how the whole mechanism works to begin with, and so do not recognize the dependence of breathing on the overall coordination. But even teaching approaches that appreciate the importance of bodily coordination overlook its intimate connection with action, by encouraging the pupil to release or change things *while breathing*. In attempting to help the student, the teacher may be well-intentioned; but the only way he knows to realize his good intentions is by giving the student something to "do," and the student's attempts to implement these instructions will only end up increasing the interference. No matter what you tell the singer to do or even to think, if he does it while thinking of breathing he will interfere by exaggerating or distorting the movements of the bellows.

To return, then, to the singer's problem, how can he maintain the natural coordinations of the trunk during vocalization if the very attempt to do this makes him interfere? Put in terms of ideomotor action, how can he sing in a new way if the idea of doing so evokes the old motor pattern? The pupil must stop trying blindly to correct his actions. He must, in fact, stop entirely, and reconsider his problem. He knows that the breathing takes place automatically when he is properly coordinated. It is only when he attempts to speak or vocalize that he interferes with these coordinations. The question then becomes: What is required to make sound, and can it be achieved without this usual interference?

Two things are absolutely necessary to vocalization: the flow of air in and out of the lungs (which vibrates the vocal folds) and the closure of the vocal folds (which makes them vibrate as air passes between them). Breathing is a simple enough matter. A singer knows that air comes in and out of his lungs not because he chooses to breathe, but because the body is designed in such a way that the air automatically rushes in and out to fill the changing space. In other words, to get this flow of breath, he does not have to "do" anything at all; he simply needs to maintain the correct bodily coordinations, and the air will go in and out by itself. As for the sound, the student knows that if he simply brings the vocal folds together, the air, which is already flowing in and out of the lungs, will cause them to vibrate, and sound—like the breathing itself—will occur automatically.

The student now realizes that it is not necessary to think about breathing in order to produce sound; he only has to continue to think about the bodily coordinations that ensure the natural flow of breath, and then, when he closes the vocal folds, the sound will occur by itself. Without having to do anything more than think about his coordination and bring the vocal folds together, the student has in his control the elements that are required to produce sound. And he has done this without thinking about singing *per se*.

This means that the cause of his problem—namely, the idea or desire to sing—can be circumvented. He can sing *without having an idea of, or association with, singing as he normally conceives it*. The

sound is then produced with remarkable effortlessness and seems to come from the entire body and not from the throat. He has achieved his end without having the idea of vocalizing, thereby circumventing the usual habits and interference associated with vocalizing.

Like the other skills we have looked at, coordinated vocal control is not the result of deliberate muscular effort or mechanical training, but occurs naturally and effortlessly so long as we understand our inherent design and learn to act without interfering with this design. Many acting and vocal coaches insist that, to produce sound, we must learn to build strength and to exercise the breathing muscles, even when the students who implement these techniques are clearly straining their voices and building up tension in their bodies. At the root of these techniques is the belief that, to produce a full voice, effort is somehow required, even though the greatest singers—not to mention young children and animals—produce sound effortlessly. Real expertise in vocal production, as in other skills, emerges from a process of learning not to interfere with, and intelligently managing, the body's inherent capacity for skilled action.

A few final remarks regarding the practical demands of speaking and singing: We've seen that, in order for the singer to breathe properly, there must be as little interference with the breathing as possible. It may appear, then, that the principles we have been considering will not be of much help to the singer, who must by definition impose a deliberate control on the natural breathing cycle while vocalizing, in order to get breath as the music demands. How then do the principles we have been considering help the singer perform a demanding vocal repertoire?

The act of vocalizing—no matter how complex the specific demands placed upon the voice—is first and foremost the result of coordinated movements of the body as a whole. Any skills involving deliberate use of this system—even when they may place unusual demands on any *part* of it—must be built on the coordinated whole. This means that the singer must cultivate specific control based on the primary principles on which the breathing and sung tone rest, and then build upon this foundation in order to acquire greater

control. The idea that one should first begin by singing, and then attempt to improve upon this by making specific corrections, is putting the cart before the horse. Proper coordination is the foundation upon which all skill is built and should serve as the basis for all subsequent development. If such a foundation is weak, then specific efforts at vocal and breath control will be misdirected and lead eventually to weakened breathing and vocal distortions. Far from being inapplicable to the unusual needs of the singer, the principles involved in normal breathing are all the more important precisely because the singer's intensified demands require the maximum efficiency of the coordinated whole on which the specific functions are built. These principles apply equally to public speaking and voice for actors, playing wind and brass instruments, and learning to breathe in general.

2. The Thinking Pianist

Let us turn now to the case of a piano student who is trying to learn a complex piece and has become frustrated at being unable to master the difficult passages. When confronted by such technical problems, the student determines to practice harder by playing these passages over and over, trying to get his fingers to perform the agile movements required. Closer observation of the student's playing, however, reveals that he is playing sloppily and unevenly over the difficult passages, and that his actions are slightly rushed. Not having taken the time to think the passages through carefully, the student is essentially practicing his bad habits. In the process of pushing himself to play the notes, he is actually preventing himself from thinking clearly about what he is trying to do and is unable to execute his intentions.

The first step in helping the student overcome his difficulties is to break the cycle of struggling with technique and practicing errors, by getting him to step away from the piano and to give up trying to perform the passages correctly. With the help of a skilled teacher, he must then approach the instrument with an improved coordination, or reduced state of tension, and then see if he can play without indulging in his harmful habits. If, for instance, the student tenses his shoulders and tightens his neck to play, he must see if he can raise his arm to the piano without making these unnecessary actions. At first, he will not be able to control this tendency, because his actions are so instinctive and unconscious that he is unaware that he uses too much tension to play, and he reacts uncontrollably when he thinks of raising his arm to the piano. As his condition improves, however, he will be able to kinesthetically identify the tension as it occurs, which in turn will give him an increased control over the act of using his arms at the piano.

The next step is to help the student play a simple phrase, on only one hand, while maintaining this improved coordination and

reduced level of effort. Before attempting to play the passage, the student must become completely clear on what he is doing by defining precisely what notes he must play, the exact sequence, and the fingering. First he must do this away from the piano, then at the piano at an extremely slow tempo, so that, instead of achieving the goal of playing the section quickly, he is giving himself an extremely simple goal and executing it with perfect control, precision, and clarity. Even when he has mastered this step, he must resist the temptation of seeing if he can play the passage more quickly, and stay true to the process the teacher is giving him.

The main difficulty for the student, at this stage, is in realizing what it means to clarify or think through what he is doing. When we are learning a piece of music, we think that if we have memorized it and can play it through, we know the notes. But when we are asked to perform something in a way contrary to our habit—by executing the action without our usual tension or at an extremely slow tempo—we realize how little we really understand what we are trying to do. In order to truly understand the notes, the pianist must clearly and precisely define to himself not simply what notes he is trying to play, but how each one follows the previous one. He must examine, in painstaking detail, the notes in the passage until he is completely clear on the challenge in front of him, until the passage becomes so straightforward, so simple, that playing it slowly is no more difficult than simply raising his arm to the piano.

When the student has mastered these two elements, his next step is to isolate and define other difficult passages, on the right and left hand separately and then the two together, until he can play all of these as easily as the first. At some point, the student may find that his playing has improved, but he must continue to resist the temptation to play the passages quickly until he has put all of them together and, by mastering each element in turn, can play the entire piece with perfect clarity. The student will now find that he is able to play the piece more quickly, but effortless control, not speed, should continue to be his goal. The only way to accomplish this is to make a conscious decision not to play quickly, and then to break the

piece down into minutely detailed steps to be played at a very slow tempo and with total control.

Two elements, then, are required to master the piece. The first element (to reverse the above order) is to think about, to clarify, what one is trying to do. The student must ask himself—often by moving away from the piano—to imagine what notes he is playing, and in so doing, commit this knowledge to memory. He must also break down difficult sections until they are absolutely clear in his mind. It is this clear thinking that then helps to coordinate the activity of the fingers, hands, and arms. This thinking, this grasping of the "content" of what is to be done, controls the actual performance and therefore represents the "positive" component of the process.

This thinking, intangible as it may appear in comparison to "doing," is a key element in his performance. The problem may appear to be how to get the fingers to perform an agile feat, but the organizing factor in complex playing is the clarity of thought behind the movement. Most piano students, when they are attempting to master a particular piece of music, often have an imperfect understanding of the piece of music they are playing and respond to difficult passages not by trying to understand better what they are attempting to do, but by playing the piece over and over again. They continue to try to execute something, without knowing what that something is.

The second element is the breaking of old habits. The student thinks his failure is due to not having mastered the complex movements necessary to execute the passage, and that therefore his problem is that he hasn't found the right way to do it. But his attempts to play the notes—even when he is clear on what he intends to do or tries to play in a new way—are stimuli to ideomotor responses—habitual, ingrained patterns of behavior that actively prevent him from executing movements that do not fit in with his habit and therefore interfere with his playing. Clear thinking coordinates the activity of the fingers, but the student's preexisting habits are positively aimed in another, wrong direction,

actively pushing into the old ruts to which they have become accustomed.

These habits, we have seen, occur as a pattern of tension that interferes with the muscular system. When this system is restored to its natural or more lengthened condition, this makes it possible for the pianist to kinesthetically perceive these tensions and, in turn, to prevent these wrong patterns of action that interfere with his playing. This eliminates the positive impulse in the wrong direction and enables him to establish new, better-coordinated pathways. There is no longer a conflict between what he would like to do and his existing habits; the breaking of the habitual pattern creates the space within which he is free to do something new, allowing his thinking to serve its coordinating function, unimpeded by old habits.

Notice that, in approaching the piece in this way, the student's problem now shifts from the physical challenge of being able to play the notes to the mental challenge of attending to himself while he does it. The reorganization of activity through thinking is in this sense only part of a larger reorganization that involves replacing old habits with actions consciously performed. The prevention of the old habits, and the reorganization of his perceptions through thinking, are continuous with one another, the two together constituting the new, consciously thought-out process of mastering the piece. Studying how he plays is not about "doing" but about thinking and awareness: he is quite literally replacing brawn with brain.

In the previous cases we have looked at, the student was required to think in a new way in order to overcome his difficulty: the driver needed a structured environment within which she could safely learn the various elements of driving; the tennis player needed to observe and experiment and, finally, to reconstruct her own actions; the singer, to learn to "inhibit" wrong activities and to understand the process of vocalizing. "Doing," as it has been portrayed in each of these examples, really refers to unclear, inefficient thinking, which had to be rectified first by stopping and then reexamining what the problem was. But perhaps no skill more than piano

illustrates the central importance of thought in coordinating activity, for the simple reason that there is so much to think about.

At first, this approach to learning a piece of music seems tedious, but the student soon learns that this attention to detail is the source of real intelligence in approaching the instrument. Until now, the student has been focused entirely on results. He gets upset if he can't learn something, and failure to learn only makes him work harder and use more repetition. He now learns that the primary function of practicing is not to strengthen, repeat, or mechanically perform complex motions, but to break problems down and think out the component steps of difficult passages until they become easy and manageable. The true purpose of practicing is not to get things right, but to clarify what one is trying to do and to find room for the application of intelligence to one's playing. Practice becomes a process not of overcoming difficulties with more effort, but of making what is difficult easier.

This new approach to playing implies an entirely new attitude, a desire to study oneself and achieve greater excellence, not to try to get to the goal. It also requires self-examination, since one cannot approach the instrument in this way if one is driven by crude ambition and competitiveness and has no higher motivation for playing. If the student is willing to undertake this process, he is no longer caught up in long-term ambitions and struggles, but begins to take joy in the process of learning itself. Practicing becomes more focused, precise, and rewarding; the student finds that he no longer becomes obsessive and overinvolved, but is focused and detached. He has achieved an attitude of disciplined patience.

This new approach also helps to bridge the apparent gulf between technique and musical interpretation. In Chapter Two we saw that, initially, the student will have to translate the notes as they are written on the page to the keyboard itself, seeing how they relate to one another and in what sequence. After he has mastered the particulars of the piece he is working on, he will no longer have to think about the music in terms of the notes to be played on the keyboard, and will then be able to direct his performance with his "inner listening"—with his musical ear. These two stages roughly

correspond to the two stages of learning to type, in which the performance is initially guided by the knowledge of where the letters are, and later by the words and thoughts one wishes to communicate. This, of course, is the whole point, since musical expression (or, in the case of typing, communicating ideas), not the skilled activity of hitting notes on the piano, is his goal. Just as the "technical" aspect of his playing is controlled through "knowing" the notes and their relation on the keyboard, the interpretive aspect of the music is controlled through his musical imagination.[2]

For the classical musician, who does not create new music but brings other composers' conceptions to life, this approach becomes the source of new creativity as well as enjoyment, because it taps the player's true sense of expressive purpose. Instead of struggling with the physical challenge of trying to play difficult passages, and then trying to infuse the notes with musical intention, the process of thinking out a passage and musically interpreting it are married, since the notes one is playing and the musical idea these notes express are both controlled by the same intelligent function. Interpretation is superseded by real musical intention—so much so that it can become the source of an even higher form of creativity than the most abandoned or spontaneous improvisation or composition.

And since both technique and interpretation are functions of clear thinking and freedom from rigid habit, technique and musicality are —or should be—continuous with one another. The thinking that coordinates performance is a form of imagination just as "inner listening" is, and both are forms of intelligent control. The dichotomy of technique (on the one hand) and musicality (on the other)—rigid practicing to acquire technical proficiency, and trying to put "feeling" into the notes to make one's playing musical—is a spurious one. Ultimately, technique should heighten sensibility and never be mindless and dull; the process of learning how to technically master a piece of music, instead of dulling the performer and the performance, should awaken one's potential and inform one's musicality.

3. Hitting the Inner Target

Let us turn finally to the problem of achieving conscious mastery in skill. When one considers that, in any skill, the self is the central agent out of which all attempts at learning and performance must emanate, one must acknowledge—at least on a philosophical level—that the self occupies a central place in the learning and teaching of skill. Yet in my experience, few students and teachers of skill are able to grasp fully the significance of this concept. Because we tend to view performance as the physical expression of a governing higher agency (in the case of the pianist, artistic expression), we tend to separate motor performance from musical expression. The mind is seen as the controlling agent and the body as the vehicle that dutifully executes its orders. Accordingly, any attention we give to the physical dimension of performance is seen as useful, but not ultimately crucial to the control over performance. In the means-end continuum, the physical —the "how"—is subordinated to the mind, which is therefore seen as the real basis for know-how.

Yet nothing could be further from the truth. When we pay close attention to the "how" of performance, we ultimately learn to conceive more clearly what we want and to execute our mental intentions with greater clarity. Action, coordinated by a clearly conceived idea, becomes effortless and quite literally "does" itself. When we pay attention to the "how," the "what" takes care of itself. This is the subject to which I would now like to turn.

As we've seen, according to the usual methods of learning, action is repeated over and over with the intention of acquiring specific control and dexterity. But well-coordinated actions are not an achievement of this or that specific muscle, since they occur within the context of a complex network of muscle pulls that include the head, trunk, and limbs. If we want action to occur in a coordinated

way, the particular act must take place without interfering with this total system.

The question is how to accomplish this. We saw in the case of the pianist that when he raised his arms to play, he habitually tightened the muscles of the neck, back, and limbs. As a first step, it was necessary to bring about an improved condition of the muscular system. Yet even when we made adjustments to this system so that it was properly coordinated, the moment he thought of playing, he tightened his neck, back, and limbs. How then does he raise his arm to hit the notes, if the very thought of activity brings this interference into play?

We saw in the last section that when the pianist has the idea or impulse to act, this desire invokes harmful habits that interfere with the proper muscular coordinations. In order to avoid these habits, he must act without the thought of action.[3] This cannot happen until he has become physically poised and detached from the usual preoccupation with ends; he must quiet the mental field of ideas in order to act from a quiet mind.[4] When he is focused on maintaining the proper coordinations and inhibiting the desire to try, the act of quietly waiting, of suspending action, becomes the focal point for a new sort of action. The breaking of the habit of trying opens up space for conceiving clearly what he wants to do, and for allowing that conception to realize itself effortlessly within the context of a poised, coordinated state.

When this state is achieved, when the network of muscle pulls is perfectly in balance and the performer is able to maintain that system in a coordinated state while executing a specific motion, then the act of raising the hand occurs as if by itself, with a minimum of distortion and without any sense of effort. The movement of the arm is no longer experienced or sought after as a deliberate act but occurs effortlessly in the context of a coordinated whole. He doesn't deliberately attempt to hit the notes, but releases his hand in response to a clearly thought-out conception.

To initiate activity in this way is to achieve effortless performance. The performer normally worries about whether he can execute difficult passages. But when the muscular coordinations are

established that allow for poised, effortless action, the focus of attention changes. By deliberately refraining from playing and attending not to the goal of playing the correct notes but the process of how he plays, his hand will move not in order to hit the right notes, but because the conception of what notes he wants to hit will guide it. The hand cannot fail to hit the target because it is coordinated by a conception that includes the perception of the target.

By paying attention to the process of how he plays, then, the pianist doesn't merely improve how he executes the action but achieves his goal more intelligently. By preventing harmful habits, he discovers what works in a positive sense: the improved coordination, coupled with a clear conception of the goal, becomes the means of performing the act in a new way, opening up unexplored territory and revealing a new and more direct path to the target. The usual pedagogy of mechanical practicing and of trying is replaced with a far subtler and more intelligent process.

Notice that in this new way of doing things, action is no longer executed through a controlling mind that oversees the physical execution of the act and is therefore seen as separate from the body. When the pianist performs the act of playing with a perfectly coordinated mechanism, action feels strange and disembodied, as if he has lost direct control over the hand and it moves of its own accord. Yet what he loses in one way he gains in another: the sense that he no longer manipulates the hand to move in a particular way implies that it moves more sensitively in response to his conception. Before, he was trying to control actions that were meant to hit—but might miss—the target. Now the idea of what he wants is incorporated into the coordination of the entire act. This means that the controlling element of performance is no longer exerted over movement in an effort to be right (a notion that is in any case illusory since there is no mind separate from the body) but is replaced with an act in which the idea of what he wants is part of the coordinated act itself. The act is controlled in process.

This experience of control in process resembles the infantile experience: movement occurs by itself, and the resulting experience

happens *to* the child as a kind of transformational sensory experience. Alert as he is, however, the child has no mastery over the process, nor is he conscious of the process governing the action, whereas the adult who experiences effortless action has achieved a level of mastery that can be applied at will through the overseeing medium of an alert, conscious mind.

If the experience of action without effort implies a loss of direct manipulative control, it also implies the loss of what is known and familiar. When we use effort, we have a sense of rightness, of familiarity, and it is this familiarity which gives us the feeling that we have power and control over our movements. But this sense of familiarity is also what invokes the harmful, interfering habits: what works is paradoxically what limits. To achieve effortless action, we must give up this sense of what is familiar. To break free of our limitations, we must give up what has worked in the past and try something entirely new.

In performing actions in this way, the pianist achieves a more conscious and balanced mental state. Instead of being busy with distracting thoughts and preoccupied with the goal, his mind becomes focused, a quiet field out of which the physical realization of the act can take place with little concern for results. In this state of awareness, there is no element of fear because there is nothing that might go wrong and nothing to get right. There is no concern over results or desire to take credit for success because the performance occurs purely as the result of adherence to a process that involves only attention to himself rather than to some act that he is attempting to perform correctly.

I am aware that, in suggesting that a consciously performed act occurs effortlessly and with such precision, my viewpoint may be construed as fanciful or grandiose. But effortless and highly precise action is a principle of nature and can be found throughout the animal kingdom. What I am proposing is a process of putting in place the elements that allow this principle to operate consciously through the application of sound physiological principles. I do not mean to suggest that consciousness itself has the power to attain such perfection, or to glorify consciousness as a force capable of

transcending the laws of physics. But we do possess the capacity, through the application of conscious intelligence, of tapping our innate potential to produce effortless action in accordance with our natural design. This capacity, when achieved, does approximate perfection and seems nothing short of miraculous; the old techniques of repetition and effort seem mundane and trivial in comparison.

One might also ask why a consciously performed act should be preferable to instinctive action. In theory, consciousness does not confer superiority over action, since fluid and effortless action occurs at a purely subconscious level in animals and children without ever having to be learned. In adults, however, subconscious action normally becomes unreliable over time; even the simplest activities become compromised by harmful tensions that interfere with natural coordination. The only way to restore these elements and to bring them under intelligent control is to relearn action at a conscious level.

When we apply this principle of conscious action to performance, we are ultimately achieving control over the learning process itself. The traditional learner tries over and over to hit the target, to execute the swing correctly, to get the sequence of notes right. This orientation reinforces the illusion that there is an outside target, something to hit or succeed at by performing an action correctly. It cultivates the habit of trying to be right and to do the right thing, and indulges a kind of false pleasure in doing, an illusory form of enjoyment that is so often betrayed by the disappointment of losing the game, performing badly, or simply being frustrated at one's lack of improvement. In fact, there is no outside target, not only in theory but in reality, since aiming the ball into the hole or hitting the right notes is entirely a function of how we coordinate factors within the self. By conceiving the target as a factor within the self, the concern with hitting the external target dissipates; one gives up the desire to achieve by effort because the goal is conceived not as an external challenge but an internal discipline.

When one has achieved conscious action, one realizes the limitations and futility of willful "doing," of thinking that success is

doing one thing as opposed to another. The will to succeed and the desire to be right invoke the habits that undermine truly balanced and coordinated action, perpetuating the very tendencies that ensure failure, or at the very least impede further progress. Such efforts are also based on the notion of right and wrong; in the act of trying to be correct, one affirms the possibility of being incorrect. The desire to hit the target implies its opposite—namely, the possibility of missing it.

Behind the endless attempts to improve, to hit the right notes, is the belief that the notes on the piano exist as an objective challenge that must be overcome, even though the piano is inanimate and the only real obstacle to overcome is one's own limitations. A particular sequence of notes on the piano doesn't exist except insofar as we conceive it that way; hitting the keys is entirely a function of the pianist's coordination and intelligence. Even looking to see where the keys are is an activity that concerns the pianist, not the piano. Since skilled performance is not so much a matter of achieving particular ends but of disciplined attention and intelligence, the target is ultimately not the piano but elements within the self.

Now of course it might be argued that even the concern with ends, with getting something right, is a manifestation of the self. However, when we are concerned about ends, this implies preoccupation with the wrong factors, a lack of command over the means of properly coordinating an action. In contrast, recognition of the central role of the self implies greater control over the elements of performance itself. For any learner who takes the time to learn these principles, mastery of these elements ensures a level of competence and understanding far beyond what one can achieve through reliance on blind habit and trying.

In the common method of trying to get something right, learning a skill is not an educative experience, but a mechanical, dulling process. When skill involves an intelligent working out of means and ends, the process becomes educational in the truest sense of the word, leading not only to improved mastery of the specific skill but ultimately to self-mastery.

Notes

CHAPTER ONE: LEARNING HOW TO LEARN

1. “A Process Larger Than Oneself,” D. Blum, *The New Yorker*, 5/1/89, Vol. 65, Issue 11, p. 48.
2. For a lucid explanation of this concept, see John Dewey’s *Art as Experience*, pp. 44–50.
3. Axelrod, Herbert, ed., *Heifetz* (Neptune City, NJ: Paganiniana Publications, 1976), pp. 123–26.
4. Holt, John, *How Children Fail* (Reading, MA: Perseus Books, 1982).

CHAPTER TWO: THE ELEMENTS OF SKILL

1. Nelson, Randy F., ed., *Martial Arts Reader*, pp. 295–97.
2. James, William, *The Principles of Psychology*, William James, Vol. 1, p. 417.
3. Dart, Raymond, *Skill and Poise*, p. 10.
4. *Ibid.*, p. 11.
5. Juhan, Dean, *Job's Body*, pp. 227–28.
6. *Ibid.*, pp. 223–24.
7. *Ibid.*, p. 246.
8. Nicklaus, Jack, *Golf My Way* (New York: Simon and Schuster, 1974).

See also: Lazarus, A., *In the Mind's Eye* (New York: Rawson Associates, 1977); Nideffer, R., *The Inner Athlete* (New York: Thomas Crowell, 1976); Suinn, R., "Body thinking: psychology for olympic athletes," *Psychology Today* (July) 10:38–43, 1976; Suinn, R., "Imagery rehearsal: application to performance enhancement," *Behavior Therapist* 8:155–59, 1985; and White, K.D., Ashton, R., and Lewis, S., "Learning a Complex Skill: Effects of Mental Practice, Physical Practice, and Imagery Ability," *International Journal of Sport Psychology* 10, 2, 1979.

CHAPTER THREE: TENSION IN PERFORMANCE

1. The procedure described here is based on the Alexander Technique, developed by F. Matthias Alexander. For further description of the Alexander Technique, see Frank Pierce Jones, *Freedom to Change*, pp. 5–15.
2. F. Matthias Alexander demonstrated the crucial role of head/neck reflexes in influencing movement and postural patterns. In *The Use of the Self*, Alexander describes the principle of the relationship of the head and trunk (pp. 27–28), and the harmful tensions and disruption in functioning associated with the improper use of this mechanism (pp. 32–33).
3. For more on the physiological principle of the head/trunk relationship, see Alexander, F. Matthias, "Bedford Physical Training College Lecture," p. 175, *Articles and Lectures*. See also the chapter entitled "What is the Mechanism?" in Frank Pierce Jones' *Freedom to Change*. Also see Magnus, Rudolph, "Animal Posture," Proceedings of the Royal Society of London, 1925, 98 (Ser. B):339–53, and "Physiology of Posture," *Lancet* 211:531–36, 1926. In these papers, Magnus describes his experimental work with animals, in which he demonstrated the key organizing role of head/neck reflexes.
4. For further technical discussion of the upright human posture and its role in the evolution of skill, see the papers of Raymond Dart, "The Attainment of Poise," "Voluntary Musculature in the Human Body: The Double-Spiral Arrangement," and "The Postural Aspect of Malocclusion," in *Skill and Poise*.
5. Magnus, Rudolph, *Body Posture*, pp. 244 and 345.

CHAPTER FOUR: TENSION AND PERFORMANCE ANXIETY

1. Holt, John, *How Children Fail*, pp. 72–73.
2. Herrigel, Eugen, *Zen in the Art of Archery*, pp. 52–53.

FIVE: THE ROLE OF REACTION IN SKILLED PERFORMANCE

1. In *Principles of Mental Physiology* (1887), an early treatise on psychology, the nineteenth-century physiologist William Carpenter challenges the view that actions follow the dictates of the will, and on the basis of this concept contends that everyday behaviors are in fact automatic forms of action, which he calls "ideo-motor actions."

See also see William James, *The Principles of Psychology*, Vol. 2, on "The Will," pp. 522–28.

2. In *Talks with Teachers*, pp. 117–18, William James gives the following definition of the automatic nature of our everyday actions: "All the ingrained procedures by which life is carried on—the manners and customs, dressing and undressing, acts of salutations, etc. —are executed in this semi-automatic way unhesitatingly and efficiently, the very outermost margin of consciousness seeming to be concerned in them, while the focus may be occupied with widely different things."

In *The Principles of Psychology*, Vol. 2, p. 525, William James makes the following interesting point in this connection: "The reason why [the doctrine of ideomotor action] is not a self-evident truth is because we have so many ideas which *do not* result in action."

3. See the author's *The Undivided Self*, which explores the problem of ideomotor action and how to raise it to a conscious level.

4. In *The Undivided Self*, pp. 19–30, I give a narrative account of my experience in learning piano, and describe some of the practical challenges of raising the process of action to a conscious level.

5. See the final chapter of *The Undivided Self* for a more complete theoretical treatment of the process of achieving conscious control.

SIX: THE ROLE OF HABIT IN SKILLED PERFORMANCE

1. In his discussion on skills in *Personal Knowledge,* Michael Polanyi points out that how we perform a skill is logically unspecifiable—that is, we "*feel our way* to success and may continue to improve on our success without specifiably knowing how we do it …," p. 62. Expertise, in other words, does not necessarily confer knowledge of *how* good results are produced.
2. Most singing methods, for instance, recognize the tendency in the average singer to hold the jaw, and recommend a specific exercise for freeing the muscles of the jaw. See Kristin Linklater, *Freeing the Natural Voice*.
3. In *Human Nature and Conduct*, p. 33, John Dewey writes: "What happens when one with an incorrect habit tries to act in accord with it? Clearly the idea can be carried into execution only with a mechanism already there. If this is defective or perverted, the best intention in the world will yield bad results."
4. Dewey writes: "To *reach* an end we must take our mind off from it and attend to the act which is next to be performed. We must make that the end" (*ibid.*, p. 34). Also: "Until one takes intermediate acts seriously enough to treat them as ends, one wastes one's time in any effort at change of habits. Of the intermediate acts, the most important is the *next* one. The first or earliest means is the most important *end* to discover" (*ibid.*, p. 35). For his entire discussion of the ends/means problem, see *Human Nature and Conduct,* pp. 34–37.

See also F. Matthias Alexander on the "means-whereby principle" in *Man's Supreme Inheritance*, pp. 174–5.

CHAPTER SEVEN: NON-DOING IN ACTION

1. Gallwey, Timothy, *The Inner Game of Tennis*, pp. 22–23.

EIGHT: HIGH-LEVEL SKILLS AND THE ART OF NON-DOING

1. For further discussion on this topic, see F. Matthias Alexander, *Constructive Conscious Control of the Individual*, p. 198. In his book, Alexander contrasts specific, "corrective" breathing techniques to his own method, which he says is based on "… the process of re-education, readjustment and coordination on a conscious, general basis."
2. For more on the controlling function of imagination in skilled performance, see V.A. Howard, *Artistry: The Work of Artists*, p. 136.
3. For more on the problem of performing action without the thought of acting, see the author's *The Undivided Self*, pp. 163–74.
4. For more on quieting the mind, see *The Undivided Self*, pp. 148–63.

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Dr. THEODORE (Ted) DIMON is a leading specialist in education and human development, as well as an internationally renowned teacher of mind/body disciplines. He received his master's and doctorate degrees in education from Harvard University. *The Elements of Skill* represents an important part of his 30 years of research into integrated mind/body learning and its fundamental but neglected role in education. Dr. Dimon's field of research explores man's evolutionary development, psychology, and anatomy in relation to human holistic design. He is the author of *Anatomy of the Moving Body, The Body in Motion, Your Body, Your Voice*, and *The Undivided Self*. The founder and Director of the Dimon Institute, he teaches and lectures internationally. More information about Dr. Dimon's work can be found on The Dimon Institute website: www.dimoninstitute.org