CHAPTER 1

# Creativity as a Habit

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## Introduction

### *What is Creativity?*

Creativity is a habit. The problem is that schools sometimes treat it as a bad habit. And the world of conventional standardized tests we have invented does that. Try being creative on a standardized test, and they will get slapped down just as soon as get their score. That will teach you not to do it again.

It may sound paradoxical that creativity—a novel response—is a habit—a routine response. But creative people are creative largely not by any particular inborn trait, but rather, because of an attitude toward life: They habitually respond to problems in fresh and novel ways, rather than allowing themselves to respond mindlessly and automatically.

Like any habit, creativity can either be encouraged or discouraged. The main things that promote the habit are: (a) opportunities to engage in it; (b) encouragement when people avail themselves of these opportunities; and (c) rewards when people respond to such encouragement and think and behave creatively. You need all three. Take away the opportunities, encouragement, or rewards, and we will take away the creativity. In this respect, creativity is no different from any other habit, good or bad.

For example, if you want to encourage good eating habits among students, you can do so by (a) providing opportunities to eat well in school and at home, (b) encouraging students to avail themselves of these opportunities, and then (c) praising young people who do in fact use the opportunities to eat well. Or suppose you want to discourage



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smoking, you can do so by (a) taking away the opportunities for engaging in it (e.g., by prohibiting it in various places or by making prices of cigarettes so high one can scarcely afford to buy them), (b) discouraging smoking (e.g., advertisements showing how smoking kills), and (c) rewarding people who do not smoke (e.g., with praise or even preferred rates for health- and life-insurance policies).

This may sound too simple. It is not. Creative people routinely approach problems in novel ways. Creative people habitually (a) look for ways to see problems that other people don't look for, (b) take risks that other people are afraid to take, (c) have the courage to defy the crowd and to stand up for their own beliefs, and (d) seek to overcome obstacles and challenges to their views that other people give in to, among other things.

Educational practices that may seem to promote learning may inadvertently suppress creativity for the same reasons that environmental circumstances can suppress any habit. These practices often take away the opportunities for, encouragement of, and rewards for creativity. The increasingly massive and far-reaching use of conventional standardized tests is one of the most effective, if unintentional, vehicles this country has created for suppressing creativity. I say "conventional" because the problem is not with standardized tests, per se, but rather, with the kinds of tests that we use. And teacher-made tests can be just as much of a problem

Conventional standardized tests encourage a certain kind of learning and thinking—in particular, the kind of learning and thinking for which there is a right answer and many wrong answers. To create a multiple-choice or short-answer test, you need a right answer and many wrong ones. Problems that do not fit into the right answer—wrong answer format do not well lend themselves to multiple-choice and short-answer testing. Put another way, problems that require divergent thinking are inadvertently devalued by the use of standardized tests. This is not to say knowledge is not important. On the contrary, one cannot think creatively with knowledge unless one has the knowledge with which to think creatively. Knowledge is a necessary, but in no way sufficient condition for creativity. The problem is that schooling


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often stops short of encouraging, being content if students have the knowledge.

Examples are legion. If one is studying history, one might take the opportunity to think creatively about how can we learn from the mistakes of the past to do better in the future. Or one might think creatively about what would have happened had a certain historical event not come to pass (e.g., the winning of the Allies against the Nazis in World War II). But there is no one "right" answer to such questions, so they are not likely to appear on conventional standardized test. In science, one can design an experiment, but again, designing an experiment does not neatly fit into a multiple-choice format. In literature, one can imagine alternative endings to stories, or what the stories would be like if they took place in a different era. In mathematics, students can invent and think with novel number systems. In foreign language, students can invent dialogues with people from other cultures. But the emphasis in most tests is on the display of knowledge, and often, inert knowledge that may sit in students' heads but may at the same time be inaccessible for actual use.

Essay tests might seem to provide a solution to such problems, and they might, but as they are typically used, they don't. Increasingly, essay tests can be and are scored by machine. Often, human raters of essays provide ratings that correlate more highly with machine-grading than with the grading of other humans. Why? Because they are scored against one or more implicit prototypes, or models of what a "correct" answer should be. The more the essay conforms to one or more prototypes, the higher the grade. Machines can detect conformity to prototypes better than humans, so essay graders of the kind being used today succeed in a limited form of essay evaluation. Thus, the essays that students are being given often do not encourage creativity—rather they discourage creativity in favor of model answers that conform to one or more prototypes.

Oddly enough, then, "accountability" movements that are being promoted as fostering solid education are, in at least one crucial respect, doing the opposite: It is discouraging creativity at the expense of conformity. The problem is the very narrow notion of accountability



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involved. But proponents of this notion of accountability often make it sound as though those who oppose them oppose any accountability, whereas, in fact, they instead may oppose only the narrow form of accountability conventional tests generate. The tests are not "bad" or "wrong," per se, just limited in what they assess. But they are treated as though they assess broader ranges of skills than they actually do assess. Curiously, governments may have a stake in such narrow, but not broad, forms accountability.

Governments often wish to encourage conformity—after all, they see themselves as promoting order, usually order with respect to themselves—and so they inadvertently may prefer an educational agenda that promotes a model of an educated person that minimizes or excludes creative (i.e., nonconforming) thinking. Their goal is not necessarily to punish creativity, but rather to ensure their own stability and longevity. The punishment and extinction of creativity is merely a byproduct. Thus, they may promote education, but not a kind of education that fosters creative thinking. They may also fail to promote active critical thinking, which also potentially puts their longevity at risk. Sometimes, they will allow creative or critical thinking, so long as it is not applied to their own policies. It is easy for a government or other powerful organization to slip into the view that critics are "traitors" who must be ridiculed or punished. Inert knowledge is much safer to stability, because it gives the appearance of education without most of the substance.

Governments sometimes go the other way. In order to enhance economic competitiveness a program is initiated to encourage creativity in citizens. Did this initiative, however, result in sharp increases in creativity? It is doubtful. Why? Because it is one thing for an authority to encourage creativity, and quite another to get people to believe that enhancing creativity will lead to better outcomes in school or in life. Creativity is socialized through thousands upon thousands of acts of teachers, parents, and other authority figures. So is conformity. If people have been socialized over the years to think in conforming ways, and if they have been rewarded for conforming, no single governmental initiative is likely to change the way people think and act. Conformity


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may be so much a part of the social fabric that people give it up only reluctantly.

Whereas creativity is seen as departure from a mean, conformity is seen as adherence to that mean. Societies often speak of the "tall-poppy" phenomenon, whereby tall poppies—those that stick out—are cut down to size. If one grows up in a society that cuts down the tall poppies, or does what it can to ensure that the poppies never grow tall in the first place, it will be difficult to generate creative behavior. People in such societies will be so afraid of departure from the mean that the will be unwilling to be creative, whatever their creative abilities might be.

Why is creativity even important? It is important because the world is changing at a far greater pace than it ever has before, and people need constantly to cope with novel kinds of tasks and situations. Learning in this era must be life-long, and people constantly need to be thinking in new ways. The problems we confront, whether in our families, communities, or nations, are novel and difficult, and we need to think creatively and divergently to solve these problems. The technologies, social customs, and tools available to us in our lives are replaced almost as quickly as they are introduced. We need to think creatively to thrive, and, at times, even to survive.

But this often is not how we are teaching children to think—quite the contrary. So we may end up with "walking encyclopedias" who show all the creativity of an encyclopedia. In a recent bestseller, a man decided to become the smartest person in the world by reading an encyclopedia cover to cover. The fact that the book sold so well is a testament to how skewed our conception has become of what it means to be smart. Someone could memorize that or any other encyclopedia, but not be able to solve even the smallest novel problem in his or her life.

If we want to encourage creativity, we need to promote the creativity habit. That means we have to stop treating it as a bad habit. We have to resist efforts to promote a conception of accountability that encourages children to accumulate inert knowledge with which they learn to think neither creatively nor critically.



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## How Can We Develop Creativity in Children?

Consider 12 keys for developing the creativity habit in children.

### *Redefine Problems*

Redefining a problem means taking a problem and turning it on its head. Many times in life individuals have a problem and they just do not see how to solve it. They are stuck in a box. Redefining a problem essentially means extricating oneself from the box. This process is the synthetic part of creative thinking.

There are many ways teachers and parents can encourage children to define and redefine problems for themselves, rather than—as is so often the case—doing it for them. Teachers and parents can promote creative performance by encouraging their children to define and redefine *their own* problems and projects. Adults can encourage creative thinking by having children choose their own topics for papers or presentations, choose their own ways of solving problems, and sometimes having them choose again if they discover that their selection was a mistake. Teachers and parents should also allow their children to pick their own topics, subject to the adults' approval, on projects the children do. Approval ensures that the topic is relevant to the lesson and has a chance of leading to a successful project.

Adults cannot always offer children choices, but giving choices is the only way for children to learn how to choose. Giving children latitude in making choices helps them to develop taste and good judgment, both of which are essential elements of creativity.

At some point everyone makes a mistake in choosing a project or in the method they select to complete it. Teachers and parents should remember that an important part of creativity is the analytic part—learning to recognize a mistake—and give children the chance and the opportunity to redefine their choices.

### *Question and Analyze Assumptions*

Everyone has assumptions. Often one does not know he or she has these assumptions because they are widely shared. Creative people


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question assumptions and eventually lead others to do the same. Questioning assumptions is part of the analytical thinking involved in creativity. When Copernicus suggested that Earth revolves around the sun, the suggestion was viewed as preposterous because everyone could see that the sun revolves around Earth. Galileo's ideas, including the relative rates of falling objects, caused him to be banned as a heretic.

Sometimes it is not until many years later that society realizes the limitations or errors of their assumptions and the value of the creative person's thoughts. The impetus of those who question assumptions allows for cultural, technological, and other forms of advancement.

Teachers can be role models for questioning assumptions by showing children that what they assume they know, they really do not know. Of course, children should not question every assumption. There are times to question and try to reshape the environment, and there are times to adapt to it. Some creative people question so many things so often that others stop taking them seriously. Everyone must learn which assumptions are worth questioning and which battles are worth fighting. Sometimes it is better for individuals to leave the inconsequential assumptions alone so that they have an audience when they find something worth the effort.

Teachers and parents can help children develop this talent by making questioning a part of the daily exchange. It is more important for children to learn what questions to ask—and how to ask them—than to learn the answers. Adults can help children evaluate their questions by discouraging the idea that the adults ask questions and children simply answer them. Adults need to avoid perpetuating the belief that their role is to teach children the facts, and instead help children understand that what matters is the children' ability to use facts. This can help children learn, how to formulate good questions and how to answer questions.

Society tends to make a pedagogical mistake by emphasizing the answering and not the asking of questions. The good student is perceived as the one who rapidly furnishes the right answers. The expert in a field thus becomes the extension of the expert student—the one who knows and can recite a lot of information. As John Dewey recognized, how one thinks is often more important than what one thinks. Schools



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need to teach children how to ask the right questions (questions that are good, thought-provoking, and interesting) and lessen the emphasis on rote learning.

### *Do Not Assume That Creative Ideas Sell Themselves: Sell Them*

Everyone would like to assume that their wonderful, creative ideas will sell themselves. But as Galileo, Edvard Munch, Toni Morrison, Sylvia Plath, and millions of others have discovered, they do not. On the contrary, creative ideas are usually viewed with suspicion and distrust. Moreover, those who propose such ideas may be viewed with suspicion and distrust as well. Because people are comfortable with the ways they already think, and because they probably have a vested interest in their existing way of thinking, it can be extremely difficult to dislodge them from their current way of thinking.

Thus, children need to learn how to persuade other people of the value of their ideas. This selling is part of the practical aspect of creative thinking. If children do a science project, it is a good idea for them to present it and demonstrate why it makes an important contribution. If they create a piece of artwork, they should be prepared to describe why they think it has value. If they develop a plan for a new form of government, they should explain why it is better than the existing form of government. At times, teachers may find themselves having to justify their ideas about teaching to their principal. They should prepare their children for the same kind of experience.

### *Encourage Idea Generation*

As mentioned earlier, creative people demonstrate a "legislative" style of thinking: They like to generate ideas. The environment for generating ideas can be constructively critical, but it must not be harshly or destructively critical. Children need to acknowledge that some ideas are better than others. Adults and children should collaborate to identify and encourage any creative aspects of ideas that are presented. When suggested ideas do not seem to have much value, teachers should not just criticize. Rather, they should suggest new approaches, preferably ones that incorporate at least some aspects of the previous ideas that


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seemed in themselves not to have much value. Children should be praised for generating ideas, regardless of whether some are silly or unrelated, while being encouraged to identify and develop their best ideas into high-quality projects.

### *Recognize That Knowledge Is a Double-Edged Sword and Act Accordingly*

On the one hand, one cannot be creative without knowledge. Quite simply, one cannot go beyond the existing state of knowledge, if one does not know what that state is. Many children have ideas that are creative with respect to themselves, but not with respect to the field because others have had the same ideas before. Those with a greater knowledge base can be creative in ways that those who are still learning about the basics of the field cannot be.

At the same time, those who have an expert level of knowledge can experience tunnel vision, narrow thinking, and entrenchment. Experts can become so stuck in a way of thinking that they become unable to extricate themselves from it. When a person believes that he or she knows everything there is to know, he or she is unlikely to ever show truly meaningful creativity again.

The upshot of this is that I tell my students and my own children that the teaching-learning process is a two-way process. I have as much to learn from my students and my children as they have to learn from me. I have knowledge they do not have, but they have flexibility I do not have—precisely because they do not know as much as I do. By learning from, as well as teaching to, one's children, one opens up channels for creativity that otherwise would remain closed.

### *Encourage Children to Identify and Surmount Obstacles*

Buying low and selling high means defying the crowd. And people who defy the crowd—people who think creatively—almost inevitably encounter resistance. The question is not whether one will encounter obstacles; that obstacles will be encountered as a fact. The question is whether the creative thinker has the fortitude to persevere. I have often wondered why so many people start off their careers doing creative



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work and then vanish from the radar screen. I think, I know at least one reason why: Sooner or later, they decide that being creative is not worth the resistance and punishment. The truly creative thinkers pay the short-term price, because they recognize that they can make a difference in the long term. But often it is a long while before the value of creative ideas is recognized and appreciated.

Teachers can prepare children for these types of experiences by describing obstacles that they, their friends, and well-known figures in society have faced while trying to be creative; otherwise, children may think that they are the only ones confronted by obstacles. Teachers should include stories about people who were not supportive, about bad grades for unwelcome ideas, and about frosty receptions to what they may have thought were their best ideas. To help children deal with obstacles, teachers can remind them of the many creative people whose ideas were initially shunned and help them to develop an inner sense of awe of the creative act. Suggesting that children reduce their concern over what others think is also valuable. However, it is often difficult for children to lessen their dependence on the opinions of their peers.

When children attempt to surmount an obstacle, they should be praised for the effort, whether or not they were entirely successful. Teachers and parents alike can point out aspects of the children's attack that were successful and why, and suggest other ways to confront similar obstacles. Having the class brainstorm about ways to confront a given obstacle can get them thinking about the many strategies people can use to confront problems. Some obstacles are within oneself, such as performance anxiety. Other obstacles are external, such as others' bad opinions of one's actions. Whether internal or external, obstacles must be overcome.

### *Encourage Sensible Risk-Taking*

When creative people defy the crowd by buying low and selling high, they take risks in much the same way as do people who invest. Some such investments simply may not pan out. Moreover, defying the crowd means risking the crowd's wrath. But there are levels of sensibility to keep in mind when defying the crowd. Creative people take sensible


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risks and produce ideas that others ultimately admire and respect as trend-setting. In taking these risks, creative people sometimes make mistakes, fail, and fall flat on their faces.

I emphasize the importance of sensible risk-taking, because I am not talking about risking life and limb for creativity. To help children learn to take sensible risks, adults can encourage them to take some intellectual risks with courses, with activities, and with what they say to adults—to develop a sense of how to assess risks.

Nearly every major discovery or invention entailed some risk. When a movie theater was the only place to see a movie, someone created the idea of the home video machine. Skeptics questioned if anyone would want to see videos on a small screen. Another initially risky idea was the home computer. Many wondered if anyone would have enough use for a home computer to justify the cost. These ideas were once risks that are now ingrained in our society.

Few children are willing to take many risks in school, because they learn that taking risks can be costly. Perfect test scores and papers receive praise and open up future possibilities. Failure to attain a certain academic standard is perceived as deriving from a lack of ability and motivation and may lead to scorn and lessened opportunities. Why risk taking hard courses or saying things that teachers may not like when that may lead to low grades or even failure? Teachers may inadvertently advocate children to only learn to "play it safe" when they give assignments without choices and allow only particular answers to questions. Thus, teachers need not only to encourage sensible risk-taking, but also to reward it.

### *Encourage Tolerance of Ambiguity*

People often like things to be in black and white. People like to think that a country is good or bad (ally or enemy) or that a given idea in education works or does not work. The problem is that there are a lot of grays in creative work. Artists working on new paintings and writers working on new books often report feeling scattered and unsure in their thoughts. They often need to figure out whether they are even on the right track. Scientists often are not sure whether the theory



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they have developed is exactly correct. These creative thinkers need to tolerate the ambiguity and uncertainty until they get the idea just right.

A creative idea tends to come in bits and pieces and develops over time. However, the period in which the idea is developing tends to be uncomfortable. Without time or the ability to tolerate ambiguity, many may jump to a less than optimal solution. When a student has almost the right topic for a paper or almost the right science project, it is tempting for teachers to accept the near miss. To help children become creative teachers need to encourage them to accept and extend the period in which their ideas do not quite converge. Children need to be taught that uncertainty and discomfort are a part of living a creative life. Ultimately, they will benefit from their tolerance of ambiguity by coming up with better ideas.

### *Help Children Build Self-Efficacy*

Many people often reach a point where they feel as if no one believes in them. I reach this point frequently, feeling that no one values or even appreciates what I am doing. Because creative work often does not get a warm reception, it is extremely important that the creative people believe in the value of what they are doing. This is not to say that individuals should believe that every idea they have is a good idea. Rather, individuals need to believe that, ultimately, they have the ability to make a difference.

The main limitation on what children can do is what they think they can do. All children have the capacity to be creators and to experience the joy associated with making something new, but first they must be given a strong base for creativity. Sometimes teachers and parents unintentionally limit what children can do by sending messages that express or imply limits on children' potential accomplishments. Instead, these adults need to help children believe in their own ability to be creative.

I have found that probably the best predictor of success among my children is not their ability, but their belief in their ability to succeed. If children are encouraged to succeed and to believe in their own ability to succeed, they very likely will find the success that otherwise would elude them.


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### *Help Children Find What They Love to Do*

Teachers must help children to find what excites them to unleash their children's best creative performances. Teachers need to remember that this may not be what really excites them. People, who truly excel creatively in a pursuit, whether vocational or avocational, almost always genuinely love what they do.

Helping children find what they really love to do is often hard and frustrating work. Yet, sharing the frustration with them now is better than leaving them to face it alone later. To help children uncover their true interests, teachers can ask them to demonstrate a special talent or ability for the class, and explain that it does not matter what they do (within reason), only that they love the activity.

In working with my children and my students, I try to help them to find what interests *them,* whether or not it particularly interests me. Often, their enthusiasm is infectious, and I find myself drawn into new areas of pursuit simply, because I allow myself to follow my children rather than always expecting them to follow me.

I often meet students who are pursuing a certain career interest not because it is what they want to do, but because it is what their parents or other authority figures expect them to do. I always feel sorry for such students, because I know that although they may do good work in that field, they almost certainly will not do great work. It is hard for people to do great work in a field that simply does not interest them.

### *Teach Children the Importance of Delaying Gratification*

Part of being creative means being able to work on a project or task for a long time without immediate or interim rewards. Children must learn that rewards are not always immediate and that there are benefits to delaying gratification. The fact of the matter is that, in the short term, people are often ignored when they do creative work or even punished for doing it.

Many people believe that they should reward children immediately for good performance, and that children should expect rewards. This style of teaching and parenting emphasizes the here and now and often comes at the expense of what is best in the long term.



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An important lesson in life—and one that is intimately related to developing the discipline to do creative work—is to learn to wait for rewards. The greatest rewards are often those that are delayed. Teachers can give their children examples of delayed gratification in their lives and in the lives of creative individuals and help them apply these examples to their own lives.

Hard work often does not bring immediate rewards. Children do not immediately become expert baseball players, dancers, musicians, or sculptors. And the reward of becoming an expert can seem very far away. Children often succumb to the temptations of the moment, such as watching television or playing video games. The people who make the most of their abilities are those who wait for a reward and recognize that few serious challenges can be met in a moment. Children may not see the benefits of hard work, but the advantages of a solid academic performance will be obvious when they apply to college.

The short-term focus of most school assignments does little to teach children the value of delaying gratification. Projects are clearly superior in meeting this goal, but it is difficult for teachers to assign home projects, if they are not confident of parental involvement and support. By working on a task for many weeks or months, children learn the value of making incremental efforts for long-term gains.

### *Provide an Environment That Fosters Creativity*

There are many ways teachers can provide an environment that fosters creativity. The most powerful way for teachers to develop creativity in children is to *role model creativity.* Children develop creativity not when they are told to, but when they are shown how.

The teachers most people probably remember from their school days are not those who crammed the most content into their lectures. The teachers most people remember are those teachers whose thoughts and actions served as a role model. Most likely they balanced teaching content with teaching children how to think with and about that content.

Occasionally, I will teach a workshop on developing creativity and someone will ask exactly what he or she should do to develop creativity.


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Bad start. A person cannot be a role model for creativity unless he or she thinks and teaches creatively him- or herself. Teachers need to think carefully about their values, goals, and ideas about creativity and show them in their actions.

Teachers also can stimulate creativity by helping children *to cross-fertilize in their thinking* to think across subjects and disciplines. The traditional school environment often has separate classrooms and classmates for different subjects and seems to influence children into thinking that learning occurs in discrete boxes—the math box, the social studies box, and the science box. However, creative ideas and insights often result from integrating material across subject areas, not from memorizing and reciting material.

Teaching children to cross-fertilize draws on their skills, interests, and abilities, regardless of the subject. If children are having trouble understanding maths, teachers might ask them to draft test questions related to their special interests. For example, teachers might ask the baseball fan to devise geometry problems based on a game. The context may spur creative ideas because the student finds the topic (baseball) enjoyable and it may counteract some of the anxiety caused by geometry. Cross-fertilization motivates children who are not interested in subjects taught in the abstract.

One-way, teachers can enact cross-fertilization in the classroom is to ask children to identify their best and worst academic areas. Children can then be asked to come up with project ideas in their weak area based on ideas borrowed from one of their strongest areas. For example, teachers can explain to children that they can apply their interest in science to social studies by analyzing the scientific aspects of trends in national politics.

Teachers also need to *allow children the time to think creatively.* This society is a society in a hurry. People eat fast food, rush from one place to another, and value quickness. Indeed, one way to say someone is smart is to say that the person is *quick*, a clear indication of our emphasis on time. This is also indicated by the format of the standardized tests used—lots of multiple-choice problems squeezed into a brief time slot.

Most creative insights do not happen in a rush. People need time to understand a problem and to toss it around. If children are asked to



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think creatively, they need time to do it well. If teachers stuff questions into their tests or give their children more homework than they can complete, they are not allowing them time to think creatively.

Teachers also should *instruct and assess for creativity.* If teachers give only multiple-choice tests, children quickly learn the type of thinking that teachers value, no matter what they say. If teachers want to encourage creativity, they need to include at least some opportunities for creative thought in assignments and tests. Questions that require factual recall, analytic thinking, and creative thinking should be asked. For example, children might be asked to learn about a law, analyze the law, and then think about how the law might be improved.

Teachers also need *to reward creativity.* It is not enough to talk about the value of creativity. Children are used to authority figures who say one thing and do another. They are exquisitely sensitive to what teachers value when it comes to the bottom line—namely, the grade or evaluation.

Creative efforts also should be rewarded. For example, teachers can assign a project and remind children that they are looking for them to demonstrate their knowledge, analytical and writing skills, and creativity. Teachers should let children know that creativity does not depend on the teacher's agreement with what children write, but rather with ideas they express that represent a synthesis between existing ideas and their own thoughts. Teachers need to care only that the ideas are creative from the student's perspective, not necessarily creative with regard to the state-of-the-art findings in the field. Children may generate an idea that someone else has already had, but if the idea is an original to the student, the student has been creative.

Teachers also need *to allow mistakes.* Buying low and selling high carries a risk. Many ideas are unpopular simply because they are not good. People often think a certain way because that way works better than other ways. But once in a while, a great thinker comes along—a Freud, a Piaget, a Chomsky, or an Einstein—and shows us a new way to think. These thinkers made contributions because they allowed themselves and their collaborators to take risks and make mistakes.

Although being successful often involves making mistakes along the way, schools are often unforgiving of mistakes. Errors on schoolwork


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are often marked with a large and pronounced X. When a student responds to a question with an incorrect answer, some teachers pounce on the student for not having read or understood the material, which results in classmates snickering. In hundreds of ways and in thousands of instances over the course of a school career, children learn that it is not all right to make mistakes. The result is that they become afraid to risk the independent and the sometimes-flawed thinking that leads to creativity.

When children make mistakes, teachers should ask them to analyze and discuss these mistakes. Often, mistakes or weak ideas contain the germ of correct answers or good ideas. In Japan, teachers spend entire class periods asking children to analyze the mistakes in their mathematical thinking. For the teacher who wants to make a difference, exploring mistakes can be an opportunity for learning and growing. Another aspect of teaching children to be creative is teaching them *to take responsibility for both successes and failures.* Teaching children how to take responsibility means teaching children to (1) understand their creative process, (2) criticize themselves, and (3) take pride in their best creative work. Unfortunately, many teachers and parents look for—or allow children to look for—an outside enemy responsible for failures.

It sounds trite to say that teachers should teach children to take responsibility for themselves, but sometimes there is a gap between what people know and how they translate thought into action. In practice, people differ widely in the extent to which they take responsibility for the causes and consequences of their actions. Creative people need to take responsibility for themselves and for their ideas.

Teachers also can work *to encourage creative collaboration*. Creative performance often is viewed as a solitary occupation. We may picture the writer writing alone in a studio, the artist painting in a solitary loft, or the musician practicing endlessly in a small music room. In reality, people often work in groups. Collaboration can spur creativity. Teachers can encourage children to learn by example by collaborating with creative people.

Children also need to learn how *to imagine things from other viewpoints.* An essential aspect of working with other people and getting the most out of collaborative creative activity is to imagine oneself in other



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people's shoes. Individuals can broaden their perspective by learning to see the world from different points of view. Teachers and parents should encourage their children to see the importance of understanding, respecting, and responding to other people's points of view. This is important, as many bright and potentially creative children never achieve success because they do not develop practical intelligence. They may do well in school and on tests, but they may never learn how to get along with others or to see things and themselves as others see them.

Teachers also need to help children recognize person–environment fit. What is judged as creative is an interaction between a person and the environment. The very same product that is rewarded as creative in one time or place may be scorned in another.

By building a constant appreciation of the importance of person–environment fit, teachers prepare their children for choosing environments that are conducive to their creative success. Encourage children to examine environments to help them learn to select and match environments with their skills.

Creativity, then, is in large part a habit that adults can encourage in children or in themselves. It remains only for teachers to help foster this habit.

## The Investment Theory of Creativity

Together with Todd Lubart, I have proposed an *investment theory of creativity* as a means of understanding the nature of creativity (Sternberg and Lubart, 1991). According to this theory, creative people are ones who are willing and able to "buy low and sell high" in the realm of ideas. Buying low means pursuing ideas that are unknown or out of favor but that have growth potential. Often, when these ideas are first presented, they encounter resistance. The creative individual persists in the face of this resistance, and eventually sells high, moving on to the next new, or unpopular idea.

Research within the investment framework has yielded support for this model. This research has used tasks such as (a) writing short-stories using unusual titles (e.g., the octopus' sneakers), (b) drawing pictures with unusual themes (e.g., the earth from an insect's point of


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view), (c) devising creative advertisements for boring products (e.g., cufflinks), and (d) solving unusual scientific problems (e.g., how could we tell if someone had been on the moon within the past month?). This research showed creative performance to be moderately domain-specific, and to be predicted by a combination of certain resources, as described below.

According to the investment theory, creativity requires a confluence of six distinct but inter-related resources: intellectual abilities, knowledge, styles of thinking, personality, motivation, and environment. Although levels of these resources are sources of individual differences, often the decision to use the resources is the more important source of individual differences.

### *Intellectual Abilities*

Three intellectual skills are particularly important: (a) the synthetic ability to see problems in new ways and to escape the bounds of conventional thinking; (b) the analytic ability to recognize which of one's ideas are worth pursuing and which are not; and (c) the practical-contextual ability to know how to persuade others of—to sell other people on—the value of one's ideas. The confluence of these three abilities is also important. Analytic ability used in the absence of the other two abilities results in powerful critical, but not creative thinking. Synthetic ability in the absence of the other two abilities results in new ideas that are not subjected to the scrutiny required to make them work. And practical-contextual ability in the absence of the other two may result in the transmittal of ideas not because the ideas are good, but rather, because the ideas have been well and powerfully presented. To be creative, one must first *decide* to generate new ideas, analyze these ideas, and sell the ideas to others.

### *Knowledge*

Concerning knowledge, on the one hand, one needs to know enough about a field to move it forward. One cannot move beyond where a field is if one doesnot know where it is. On the other hand, knowledge about a field can result in a closed and entrenched perspective,



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resulting in a person's not moving beyond the way in which he or she has seen problems in the past. Thus, one needs to decide to use one's past knowledge, but also decide not to let the knowledge become a hindrance rather than a help.

### *Thinking Styles*

With regard to thinking styles, a legislative style is particularly important for creativity, that is, a preference for thinking and a decision to think in new ways (Sternberg and Wagner, 1993). This preference needs to be distinguished from the ability to think creatively: Someone may like to think along new lines, but not think well, or vice versa. It also helps, to become a major creative thinker, if one is able to think globally as well as locally, distinguishing the forest from the trees and thereby recognizing which questions are important and which ones are not.

### *Personality*

Numerous research investigations have supported the importance of certain personality attributes for creative functioning. These attributes include, but are not limited to, willingness to overcome obstacles, willingness to take sensible risks, willingness to tolerate ambiguity, and self-efficacy. In particular, buying low and selling high typically means defying the crowd, so that one has to be willing to stand up to conventions if one wants to think and act in creative ways. Note that none of these attributes are fixed. One can *decide* to overcome obstacles, take sensible risks, and so forth.

### *Motivation*

Intrinsic, task-focused motivation is also essential to creativity. The research of Teresa Amabile and others has shown the importance of such motivation for creative work, and has suggested that people rarely do truly creative work in an area unless they really love what they are


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doing and focus on the work rather than the potential rewards. Motivation is not something inherent in a person: One decides to be motivated by one thing or another.

### *Environment*

Finally, one needs an environment that is supportive and rewarding of creative ideas. One could have all of the internal resources needed to think creatively, but without some environmental support (such as a forum for proposing those ideas), the creativity that a person has within him or her might never be displayed.

### *Confluence*

Concerning the confluence of components, creativity is hypothesized to involve more than a simple sum of a person's level on each component. First, there may be thresholds for some components (e.g., knowledge) below which creativity is not possible regardless of the levels on other components. Second, partial compensation may occur in which strength on one component (e.g., motivation) counteracts a weakness on another component (e.g., environment). Third, interactions may also occur between components, such as intelligence and motivation, in which high levels on both components could multiplicatively enhance creativity.

Creative ideas are both novel and valuable. But, they are often rejected because the creative innovator stands up to vested interests and defies the crowd. The crowd does not maliciously or willfully reject creative notions. Rather, it does not realize, and often does not want to realize, that the proposed idea represents a valid and advanced way of thinking. Society generally perceives opposition to the status quo as annoying, offensive, and reason enough to ignore innovative ideas.

Evidence abounds that creative ideas are often rejected. Initial reviews of major works of literature and art are often negative. Toni Morrison's *Tar Baby* received negative reviews when it was first published, as did Sylvia Plath's *The Bell Jar*. The first exhibition in Munich of the work of Norwegian painter Edvard Munch opened and closed



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the same day because of the strong negative response from the critics. Some of the greatest scientific papers have been rejected not just by one, but by several journals before being published. For example, John Garcia, a distinguished biopsychologist, was immediately denounced when he first proposed that a form of learning called classical conditioning could be produced in a single trial of learning.

From the investment view, then, the creative person buys low by presenting a unique idea and then attempting to convince other people of its value. After convincing others that the idea is valuable, which increases the perceived value of the investment, the creative person sells high by leaving the idea to others and moving on to another idea. People typically want others to love their ideas, but immediate universal applause for an idea usually indicates that it is not particularly creative.

Creativity is as much a habit in and an attitude toward life as it is a matter of ability. Creativity is often obvious in young children, but it may be harder to find in older children and adults because their creative potential has been suppressed by a society that encourages intellectual conformity. Yet, anyone can decide to adopt the creativity habit. Start right now!

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