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## LIBERATING CREATIVITY AND LEARNING

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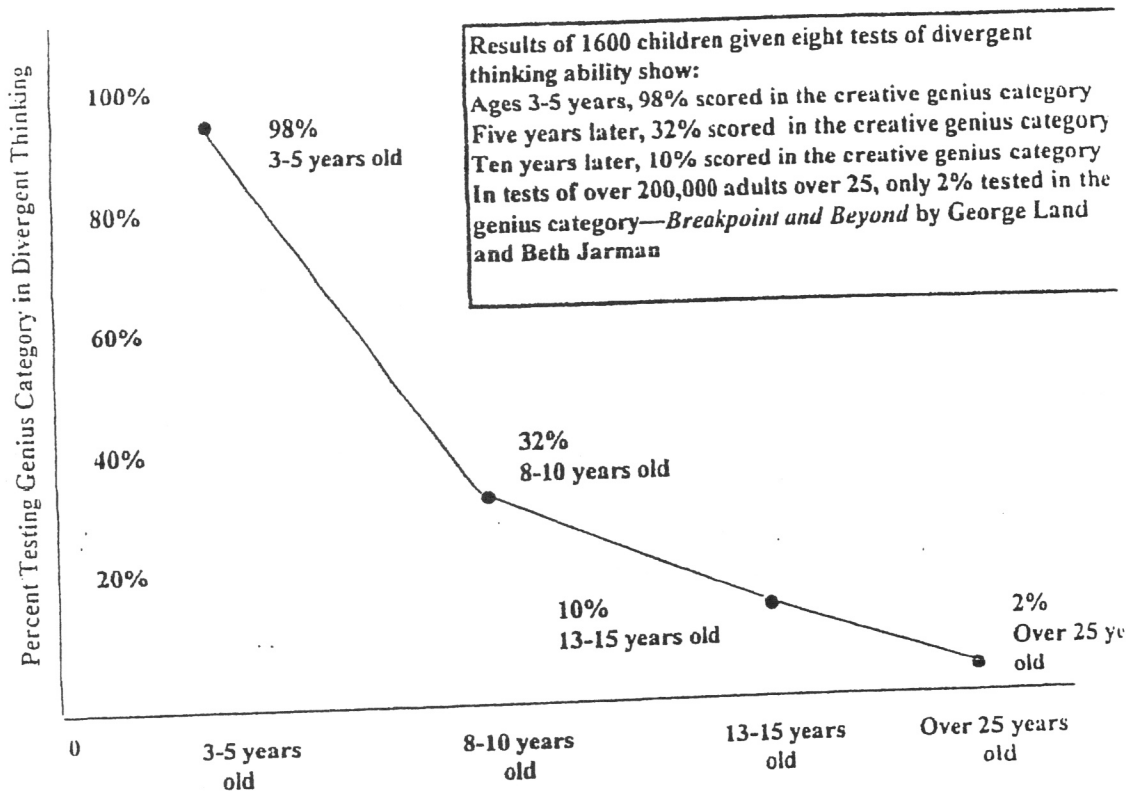
This is a chapter from *Creative Education: Educating a Nation of Innovators*, a book published in England in June of 2000. George Prince, founder and former Chairman of Synectics Corporation (the first specialist innovation consultancy). Author of *The Practice of Creativity*, (Harper and Row, 1971)

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## ABSTRACT

Connection-making is at the very heart of learning and creativity. As children grow older, they become less and less willing to make bold connections. In this article we examine this phenomenon and ways to overcome it. In Section 1: Understanding the Inhibitors to Good Thinking, we examine the involuntary shutting down of our everyday capacity to use imagination and connection-making. This process has its beginnings when a child learns that mistaken connections are punished. As infants develop, they learn to discriminate increasing anxiety from diminishing anxiety and to alter their behavior in the direction of reducing it. Sullivan calls this "foresight function," and altering behavior in the direction of reducing anxiety is a pivotal cause of most inhibitions, including what we call Inhibited Connection Making. Babies and children become exquisitely sensitive to signs of rejection, disapproval and distaste. Infants and children are naturally curious beings. Anything that arouses anxiety threatens this process of learning and meaning. When this is repeated over time, the child's foresight function triggers anxiety even before he makes a connection. The more times this process is repeated, the more sensitive the "tripwire" reaction becomes, and the less willing the child is to risk making connections to learn, to invent, to understand because it is anxiety laden. Infants and children easily differentiate between communications that discount and those that validate. Given the extreme sensitivity of children to discounts, even the most fortunate of us has a mild case of learning anxiety. In Section 2: Strategies For Creativity and Learning in the Classroom, we examine several situations in which children struggle with connection-making, creativity and learning. We focus on strategies for overcoming the limitations we and others place on our thinking. The case examples come from our observations of children and teachers over the past several years. The sessions were video taped and the tapes transcribed. The material in Section 2 is based on the transcripts. The critical factor is whether the children feel safe. What we have learned from these sessions with children and countless adults is that every group has a defensive interpersonal field until actions demonstrate that it is safe. In this section we present a detailed case example of an elementary teacher named Marilyn Yas. In the approach we have developed along with Marilyn Yas, managing and teaching the discovery idea is carried further. The objective is to help the child experience her own trial and error without evoking the anxiety of having to be instantly correct. That fear of being wrong while working toward a right answer triggers anxiety and leads to avoidance of the thinking process itself. Marilyn's approach is based entirely upon the need to reduce anxiety and free children to stretch for connections. We have spent many hours observing, video taping and actually working with her children. The children have learned

to use Synectics techniques while working in groups and by themselves. We observe that when a child does not feel meaningful, his or her learning, creating and connection-making suffer.



## SECTION 1: UNDERSTANDING THE INHIBITORS TO GOOD THINKING

In our combined experience with education, creativity and psychotherapy we have come to believe that there is a widespread impediment to good thinking and learning that could be called Inhibited Connection-Making. Connection-making is at the very heart of learning and creativity. This inhibition is not writer's block or a sudden drying up of creative juices in the work of the great geniuses, but is an involuntary shutting down of our everyday capacity to use imagination and connection-making to learn and create new ideas.

George Land and Beth Jarman (1992) trace this shutting down process to life experience. As children grow older, they become less and less willing to make bold connections. Reviewing the results of 1,600 children given eight tests of divergent thinking, they found that among children ages three to five, 98 percent scored in the "creative genius" category. Five years later, the percentage dropped to 32 percent and ten years later, only 10 percent scored in the highest category. In tests of over 200,000 adults, only two percent scored in the creative genius category. We believe that this shutting down can be attributed to the kind of interpersonal field<sup>1</sup> we experience, and within that field, to specific kinds of verbal and non-verbal interactions.

Over the years, we have observed and collected data that persuades us that certain kinds of transmissions, i.e., words, tonals and non-verbals that convey criticism, rejection, disrespect or humiliation have a remarkably negative effect on the early stages of learning and creating new ideas. We think that we now have a much better understanding of why this is so. We believe that such discounts<sup>2</sup> are anathema to learning and creative thinking because they trigger involuntary emotional and physiological reactions, especially anxiety, that lead to defensiveness and avoidance. This is not the pathway to new and adventurous connection-making.

We and others have videotaped and studied the effects of discounts on many levels from first-grade children to married couples to corporate executives. We find that the dynamics of discounting are remarkably uniform across age groups and contexts. Dis-

counts produce a pattern of behavior and lasting effects that are now very predictable. For example, John Gottman (1994) had volunteer couples come to his laboratory to discuss their marital issues. He recorded their vital signs and expressions as they did so. Over a ten year period he found that if a couple had more than one discount to every five validations their marriage would be unstable. He could predict divorce with 90% accuracy.

Research on small groups shows that discounting is directly associated with impasse and an eventual breakdown of group effectiveness (Sara Lane, 1991). Bruce Smith (1993) found that production of new ideas fell by one-half when discounting was introduced into a meeting. Robert Lefton and V.R. Buzzotta (1987-88) have shown that the habits of corporate executives vary little from those of anyone else in our culture. From an executive in their study we hear the following: "We rarely discuss things in the true sense of the word. Usually, each of us takes a fixed position early on and sticks with it. There's lots of speech-making, grandstanding and put-downs. Everyone's so intent on saving face that nobody's willing to budge."

### The Destructive Force of Discounts

Let us begin by sharing two real-life examples--one of imaginative connection-making to learn something new and the other an unwitting discount that discouraged connection-making.

We start with six year old Max who is with his grandfather on a boat. He is pumping water, invisible beneath the floorboards, out of the bilge. It is his first time. After a few minutes, the pump sucks air. Grandfather says, "What does that mean?"

Max says, "It means I have pumped out all the water."

"How do you know that?"

"From sucking a soda with a straw."

The essential action for Max is to make a risky connection that puts together something he knows with something new and previously unknown to him. Such a con-

nection does not have to meet exacting standards of precision. Pumping water is not exactly like sucking on a straw. The bilge pump is not going to swallow the water. Every connection involving something unknown presents a risk of making a "mistake," of looking and feeling stupid. Max does not experience this and he enjoys the thrill of making a connection and learning something new.

However, if, in his past experience Max had been rigorously corrected and disapproved of when he made mistaken connections, the question, "How do you know?" would have triggered anxiety and he would have had the urge to avoid the risk of proceeding, in other words, to stop thinking. His response then might have been, "I don't know." This would be an instance of what we call Inhibited Connection Making.

In another, less happy case, three-year old Winthrop sees his first real horse. "Look, Daddy, there is a big cat!" Daddy says, "No, Winthrop, that's NOT a cat. It's a horse."

A little time passes and Winthrop sees an unusual dog. It's much larger than any dog he has seen before and he guesses that it must be a horse. Daddy corrects him again. After a few hundred or thousand experiences like that, Winthrop represses his natural inclination to make a connection and asks, "What is that?"

What is wrong with asking rather than guessing? Intuitively, asking strikes us as an effective way to get answers. The heart of the problem lies in our desire to get the answer without the risk of making connections. The essential action for Winthrop is to avoid the anxiety of being wrong. His internal voice begins to alert him every time the possibility of a mistake arises. He stops guessing and making connections unless he is sure of their precision. He shuts down the most important function in the thinking process - the capacity to connect. It is too risky. Winthrop, like the rest of us, chooses feeling safe rather than feeling anxious.

To understand the power of discounts, we need to examine the development of vulnerability and defensiveness, which, like everything human, begin at birth. Newborns

are totally helpless, dependent and vulnerable except for their ability to attract the attention and regard of a loving caretaker. Every healthy infant is programmed to be alert to threats to his or her survival. The earliest such threats are experienced at four to six months and are brought on by experiences that the infant perceives as threats to survival. The clearest example is abandonment. The infant is left alone longer than he can tolerate and he is seized by the dreadful conviction that he has been left to die. At five months this is not a thought process. The fear is of being meaningless and ceasing to exist and it is felt as a formless severe anxiety. The infant's reaction is total alarm and convulsive crying. It is the beginning of fight, freeze or flight and will be a powerful influence on behavior for the rest of his or her life.

People in our experimental workshops repeat a now familiar pattern. They are not sure why they react to a discount. It is usually not a rationally dangerous or even threatening statement, yet strong feeling clutches them. They attempt to show no emotion. Yet, we observe a peak in galvanic skin response. Gottman sees heart rates soar. We know from the study of hundreds of videotapes that later there will be a revenge reaction.

In other cases, where the transmission is overtly threatening or demeaning, we see more obvious signs of distress such as hyperventilating, redness of the face and neck, sweating, or shaking. Some people describe feeling numb or going limp, unable to say anything or to think. These are all classic symptoms of anxiety. Daniel Goleman (1995) refers to such a state as an emotional emergency. In such cases, the non-rational or limbic system<sup>3</sup> is assumed to take charge. Our thinking centers shut down.

There are two kinds of emotional emergencies--physical danger and threat to meaningfulness. The limbic system does not differentiate. It signals an emergency in either case and triggers a shot of adrenaline and other arousal chemicals to prepare for fight, freeze or flight. If the threat is physical, the energy can be discharged in physical defense or offense. When the threat is emotional, we cannot discharge that energy with physical

action and it becomes, to some extent, internalized as resentment, rebellion or anger against self or substitute.

While the initial symptoms are the same as in a physical attack, discounts threaten our meaningfulness. For this reason, we often see a verbal discount followed by a quick defensive reaction such as a grimace or a retort. Later, the undischarged energy nearly always takes the form of retaliation. From many interviews with people in our workshops, the most frequent retaliation is withdrawal. This is the safest form and one of the most destructive to individuals, and, we might add, meetings. We see it in Winthrop's decision to ask first and stop guessing.

We have also observed another pattern. People try to pre-empt discounts and the accompanying anxiety by remaining silent, not participating or being very cautious in their offerings. We often hear participants use the expression, "It didn't feel safe enough to say anything." Our sensors are ever alert to the possibility of discount and the almost universal tendency to be defensive is seen throughout our research.

Why do discounts have the capacity to trigger such strong reactions? They arouse anxiety associated with earlier 'irrational' fears. The more anxiety we feel, the less rational our response. Goleman's work suggests why. He argues that "there is a steady gradient in the ratio of rational-to-emotional control over the mind; the more intense the feeling, the more dominant the emotional mind becomes--and the more ineffectual the rational." (P8)

#### Anxiety: The Core of Inhibited Connection Making

Anxiety is the first response to threatened rejection or abandonment. Thus, the gripping reaction we feel from a hurtful comment has its unconscious roots in those early fears of ceasing to exist. According to Harry Stack Sullivan (1953), the great psychiatrist, "The tension called anxiety, in early experience, is differentiated from all other reductions in euphoria by the absence of anything specific, and consequently there is in the infant no



capacity for action toward the relief of anxiety...anxiety is not manageable. Anxiety always interferes with any other tensions with which it coincides." (XVI)  
(#1)  
(P43)

In the mid fifties, Dr. Sullivan made us aware of the enormous influence of anxiety on our thinking operations and behavior. Sullivan stated that the most powerful determinant of an infant and child's well-being is the interpersonal field that is created between the child and her parents. He emphasized that the underlying apprehension that gives anxiety its overpowering force is fear of abandonment. More recently, Goleman (1995), LeDoux (1998) and van der Kolk (1997) in their studies of the brain and trauma identified the physiology of anxiety and underscored the physical component that makes anxiety such a potent influence on connection-making and thinking.

The crucial point is that no one wants to experience the anxiety that comes from discounts. Sullivan (1953) says the following: "I believe it is fairly safe to say that anybody and everybody devotes much of his/her lifetime, a great deal of his/her energy...and a good part of his effort in dealing with others, to avoiding more anxiety than he already has and, if possible, to getting rid of this anxiety." (P11)

As infants, we come equipped with three sensitive survival mechanisms: fear/pain, anxiety and sensations of joy. We feel fear or pain when there is a specific event or cause we can focus on like fear of falling off the stairs, or the pain of hunger. We experience joy when we feel loved and when we make connections to increase our growth and understanding. We also feel anxiety, as discussed, in our first six months. We might think of anxiety as a form of "emotional hijacking," to use Goleman's term. We will be subject to this hijacking on a regular basis for the rest of our lives.

Why?

The hijacking, Goleman argues, occurs instantaneously. The limbic system triggers a reaction crucial moments before the neocortex, the thinking brain, can glimpse fully what is happening, let alone decide whether it is a good idea. This is certainly the case with emotional stimuli involving rapid, minimal, automatic, evaluative processing,

e.g., auditory fear (LeDoux, 1998). In short, under some conditions, the amygdala does not need to 'consult' us to remember and react.<sup>4</sup> If the system worked otherwise, we would not long survive. A seemingly innocent discount can trigger a primitive, stored fear (Mommy "abandoning" us). The response is a rapid, automatic jolt of anxiety and an involuntary shift into maximum survival mode.

All incoming signals from the senses are routed through the amygdala pathway that scans every event for threat. This puts the amygdala in a powerful post in mental life--a sentinel challenging every situation, every perception, with two questions: Is this a threat? Or does this promise nurturance? If the answer is threat, "the amygdala reacts instantaneously, like a neural tripwire, telegraphing a message of crisis to all parts of the brain. Its extensive web of neural connections allows it, during an emotional emergency, to capture and drive much of the rest of the brain--including the rational mind" (Goleman, 1995). (P 16)

Following traditional brain science, Goleman believes that the brain has evolved from the bottom up. The higher centers developed as an elaboration of the lower, more ancient parts or limbic system. The neocortex, the so-called "seat of thought" contains the centers that put together and comprehend what our senses perceive. Its job is to add to a feeling what we think about it. The emotional hijacking occurs when the neocortex is not consulted. The limbic brain seizes control. It tells the autonomic nervous system what to do--sweat, blush, shake, freeze or retreat--and sends messages to organs like the adrenal glands to prepare us for combat or fleeing. This, to use Goleman's words, "gives the emotional centers immense power to influence the functioning of the rest of the brain--including the centers for thought." That immense power floods us with anxiety and interferes with the normal functioning of the neocortex. When participants in our workshops tell us they could not think following a discount, they mean it quite literally. The connection-making part of their brain had been overwhelmed and shut down by anxiety. (P 12)

### Training for the Amygdala

It is important for us to understand how the amygdala is “trained” to take charge of this important part of our lives. The amygdala’s genetic and instinctual assignment is to insure survival. It scans sights, sounds, feeling (touch), tastes and smells. From infancy it is in training to examine fields of information that signal support, nourishment and possible friend or mate, or danger, threat and possible annihilation. It becomes, through experience in reading the sensory field around us, both our emotional memory and the foreteller of emotions to come.

Amygdala training begins early with the infant’s powerful attachment to Mother and later to Father. We know that when infants and young children are taken from their parents and raised in institutions, even though the care is excellent, there is permanent damage to the child’s ability to relate to others. The amygdala registers this early deprivation as abuse and we become avoidant or traumatized. It tends to numb out the signals and the developing emotions of connection-making at the heart of intimate relating.

Videotape studies of the exchange of verbal and nonverbal communications, the interpersonal field between Mother and infant, reveal the enormous amount of information that an infant absorbs, most of it having to do with the instinctual questions the amygdala asks. Does this person care about me, will she nurture me, can I influence her (am I meaningful to her, does she respect me and my needs), am I safe? Anxiety is the basic communicator governing the degree of safety the infant feels. Baby experiences this dreadful feeling in her first few months when her mother suffers a pang of it and the infant ‘catches’ it. Anxiety gets its focus at about the sixth month when the infant is left alone longer than she can tolerate and she senses abandonment. Instinct tells her abandonment will lead to death. She, of course, is not aware of this as a thought, but forever after, any anxiety gets its remarkable influence from that underlying and unconscious meaning.

In the early years of intense learning and growth the infant and child is trying almost continual experiments and trial and erroring. There are two instinctual drives--one

toward individuality, independence, competence and autonomy, and the other toward belonging and togetherness and the development of interactive loving and tenderness. Success in each of these produces feelings of meaningfulness and each of us will be striving to feel and be meaningful as long as we live. "Not meaning, by definition, is utterly lonely. Well-fed, warm, and free of disease, you may still perish if you cannot 'mean'" (Kegan, 1982). (P14)

From the first few weeks, an infant has "the all-important first task of learning the nonverbal basis of social interaction upon which language will later be built. And this primary task takes several years" (Stern, 1992). He becomes expert at 'reading' non-verbal actions and reactions of his parents. By four and a half months, he learns that his caregivers "...can use their feelings and the social behaviors that show feelings [their interpersonal fields], in order to change the feelings of another person" (Stern, 1992). (P52)

A well-known experiment illustrates the sensitivity of a two and a half-month-old; it is called the still-face procedure. The mothering one wipes all expression from her face and just looks at the baby. His smiles die, and he frowns. He makes repeated attempts to re-engage by smiling, gesturing and calling her. If he does not succeed, he looks away unhappy and confused. All our lives, most of us continue to react strongly to "still" faces.

### Foresight Function

As infants develop, they learn to discriminate increasing anxiety from diminishing anxiety and to alter their behavior in the direction of reducing it. Sullivan calls this "foresight function," and [altering behavior in the direction of reducing anxiety] is a pivotal cause of most inhibitions, including Inhibited Connection Making. "If the impulse [to engage in an anxiety-laden activity] is quite strong, some mediate performance may be engaged in" (Sullivan, 1953). Babies and children become exquisitely sensitive to signs of rejection, disapproval and distaste. When such signs are repeated, they form a neural (P153)

'pathway' in the amygdala that more and more easily triggers anxiety. Infants and children are naturally curious beings. They live in a fog of confusion and are absorbed in making connections and creating meaning. Anything that arouses anxiety threatens this process of learning and meaning.

Inhibited Connection Making has its beginnings in a child's learning that mistaken connections are punished. Parent's punishment ranges from physical abuse to subtle signs of disapproval or distaste. The child's emotional interpretation registers on his amygdala. When this is repeated over time, the child's foresight triggers anxiety even before he makes a connection. Whenever he feels confusion that may lead to a mistaken connection, he gets an early warning and if he has developed little tolerance for anxiety, he will tend to stop that direction of thought. For example, he may avoid anything that confuses him.

Foresight function leads the child and adult to learn strategies to deal with the pain of anxiety by converting it to more bearable feelings. Foresight works so well that "most anxiety is not a clear ingredient of awareness; it's just a little warning which is immediately followed by anger..." (Mullahy, 1995), or other defensive operations such as inattention, distraction, no feeling, revulsion, boredom--all stratagems that defend against the anxiety that may be aroused by stretching for a connection.

The infant and child differentiate between communications that discount and those that validate. It also seems likely that children learn early to differentiate between those that impact 'loveableness' and those that are critical of intelligence or behavior. We will feel some hurt and anxiety about a criticism of our spelling, "Your spelling is wrong" but far more about rejections as a person, "You are wrong." While intellectual corrections may make us a cautious connector in learning science, rejections as a person produce such a trauma that we will gradually numb ourselves and use selective inattention to avoid the anxiety. We inhibit connecting with material that has emotional content although we may stay open to connecting to the 'purely' intellectual.

Since we know that every transmission has feeling as well as thought, we are, in effect, straining out part of the meaning. The more violent and abusive the rejections, mistreatments and neglect, the greater the consequences in inhibiting connecting-to-understand-and-create meaning. Bohm and Peat (1987) argue that

(p 231-2)

Whenever [the connection making of] creativity is impeded, the ultimate result is not simply the absence of creativity, but an actual positive presence of destructiveness.... What is even of greater danger to the child...is that it eventually brings about violence of various kinds. For creativity is a prime need of a human being and its denial brings about a pervasive state of dissatisfaction and boredom. What is even more destructive than such overt violence (and false excitement) is that the senses, intellect and emotions of the [person] gradually become deadened and the [person] loses the capacity for free movement of awareness, attention and thought.

We believe that the special situation of children--of helplessness and dependence--makes them vulnerable far more than we adults can comprehend. Every adult action that coerces, shows disregard for the child's feeling of meaningfulness. It is identified by the amygdala as a threat and triggers anxiety and reactivity. Such an event is converted by the child into a memory which contains a perturbation--a knot of energy that charges the recall of that memory with a shot of adrenaline, that fragments and interferes with meaning and understanding. Every time this type of event happens it is experienced by the child as a discount--an action that demeans him or her. It leads toward low self-regard. It also leads to Inhibited Connection Making. Winthrop stopped thinking with his imagination. He chose a safer yet far less effective way to learn: Ask for the answer. The more times this low level kind of "insult" is repeated, the more sensitive the "tripwire" reaction becomes, and the less willing the child is to risk making connections to learn, to invent, to understand because it is anxiety laden.

### Implications

As mentioned earlier, in one scientific study of discounting John Gottman discovered that a marriage, to be successful depends upon the ratio of discounts to validations. Dr. Gottman, who conducted research with couples over a twenty year period, noted the emotional impact of negative transmissions (words, tones and non-verbals) on couples discussing their everyday issues. He found that when there is more than one negative message to every five positive messages, the marriage will be unstable. The four major offenders, he found were criticism, contempt, defensiveness, and stonewalling. The result is a toxic relationship, one that will bring out the worst in each individual. Any action or event that contains disrespect will be interpreted as a need to engage in defensive or avoidance strategies.

In our observations of classrooms, the ratio of one discount to five validations is almost never maintained. All the correcting, punishing and complaining with relatively rare validations means that we are bringing out something less than the best in our children. Given the extreme sensitivity of children to discounts, even the most fortunate of us has a mild case of learning anxiety. We suspect, but cannot demonstrate, that the same undue emphasis on discounting occurs in a good many families.

In the course of videotaping invention sessions over a 35-year period, we have found that discounting actions lead to a destructive revenge action from the discountee and have a negative effect on the interpersonal field for accomplishment. Relating these findings to children is revealing. Berry Brazelton (1991, 1994) and Daniel Stern (1992) portray extreme sensitivity of children to the transmissions of their parents, teachers and other authority figures. This is not news to teachers who have observed how young children, when attempting something independently, continually check the reactions of the teacher.

The implications of Gottman's five to one 'law' suggest that present teaching and managing practices (not to mention child rearing practices) may involve far too many discounts and punishments and too few validations and too little appreciation. Such an im-

balance in positive regard we believe is an underlying cause of Inhibited Connection Making.

## SECTION 2: STRATEGIES FOR CREATIVITY AND LEARNING IN THE CLASSROOM

We next turn our attention to strategies for overcoming the limitations we and others place on our thinking. We will concentrate here on our work with children. In several cases, the children were video-taped and the tapes transcribed. The material presented here is taken from the transcripts and our field notes.

### Inventing a Grizzly Bear Repellent

Let us begin with two groups of school children placed in a situation that calls for imaginative connection making. The first group consists of eight seventh graders from a gifted and talented class. The second group, sixteen fourth graders, comes from an inner city school. The problem both groups will be addressing has no precise answer. The task at hand is to generate new ideas about how to prevent grizzly bears from attacking electrical transformers in the Canadian wilderness. The solution will be a new invention, in essence, and one they will have to create. Synectics, Inc. in Cambridge, Massachusetts hosted these two groups of children on separate occasions.

#### Seventh Graders

We have chosen this first example to illustrate how discounting inhibits imaginative connection making. We observe the children in a learning environment they can control completely. These children attend a school that prides itself on teaching kids to work together as a team. They have been taught a process called Creative Problem Solving, or CPS,<sup>5</sup> by their teacher. The process calls for the children to offer ideas without commenting. The children are taught to first list all the things they know about the problem. Then they brainstorm possible solutions with no evaluation of anyone's ideas per-



mitted. The group is supposed to have a recorder who writes the ideas on a flip chart, and a designated “chooser” who picks the children to be called upon. Unfortunately, these roles are quickly forgotten as the meeting unfolds.

As the session begins, the children are seen on the tape attempting to work as a group in a comfortable conference room with flip charts attached around the walls. The furniture is soft and inviting, much like a living room. Their teacher is not present. The children have been given a sheet describing the challenge to invent a grizzly bear repellent. Some brief information is provided suggesting the problem is mostly with male bears. They are told that chain link fences have not stopped the bears and that their invention must not be harmful to the bears or the environment. As the meeting begins, they remember something they agreed to earlier--taking turns and having a chooser but this will soon be abandoned as the kids begin interrupting each other. Matt, one of the seventh graders, will attempt to persuade the group to use a technique taught the kids by their teacher (reciting what they know about parts of the problem). Matt's effort to get the group to recite what they know about repellents is torpedoed immediately by Meghan and then abandoned.

As they start off, several kids talk at once. One boy is standing in front of a flip chart to take notes, although he never has a chance to write anything. Two members of the team, Matt and Meghan, cooperate at first but then begin to compete for leadership. The first several interactions involve primarily these two. One speaks and is cut off or interrupted by the other. Often the first speaker goes on talking despite the interruption. They eventually begin to try to assign roles and responsibilities to the others.

As the meeting moves along, Bridget offers a suggestion but Rachel immediately shoots it down. Rachel's discount is a real stretch because it is not at all clear where Bridget might be headed when Rachel interrupts her. We speculate that Bridget had in some way discounted Rachel and this interaction is a form of retaliation. A discounted person often stops cooperating with the discounter, appears to wait until the discounter is vulnerable and then evens the score. The discounted person often tends to mishear the dis-

counter, as we observe here, and the misunderstanding is nearly always in a damaging direction.

Next, several people talk at once, ignoring the exchange between Rachel and Bridget. Wayne has an idea about bees but Matt shoots it down. Meghan comes to Wayne's defense and adds honey to the idea but Wayne rejects the honey. Here we see part of the dialogue. This typifies the conversational patterns throughout the meeting. Anytime an idea is offered someone will reject it, and the originator will try to defend.

Wayne: Maybe you could have, like, I was thinking that maybe you could have like a bunch of bees around. . . [laughter]. . .

Matt: It's kinda of lame. . . [interrupted by Meghan: You're supposed to be the person that. . .]. . . I know, I was just saying to myself, don't say that. . . [others talking]. . . Hey, wait a minute, bees, right? [Wayne: bees]. . . bees. . . [that's good]. . . killer bees. . . laughter.

Meghan: No, that's a good idea . . . [others talking] . . . We could put, like, honey all over the transformer . . . [Matt: how come?]. . . and then, and that will attract the bees [Wayne: interrupts: but that will attract bears.] . . . no, no, . . . we set one of those, of those bee hive things on top of it. . .

Matt: Guys, come on you are getting a little crazy here [Meghan: no we aren't] . . . you're gonna spray the beehive green. . . [laughter from Matt and others begin to talk].

Here we see that Meghan hijacks Wayne's original idea. From Wayne's idea of having a bunch of bees around, we go to honey. Wayne responds defensively. A simple way around this kind of discount would have been for Meghan to say something like the following: "I like the idea of bees. It makes me think about using honey in some way." This construction would credit Wayne while adding a potential build on the original idea. As it stands, Wayne feels discounted.

Before long, everyone has been discounted and now five kids are standing in front of easel pads each vying for attention. There is yelling and talking at once and there is

a contest over the sketches each person is attempting to draw. The kids, still standing, engage in rapid talking about Aaron's sketch, pointing to it and making comments, all at the same time. The sketch shows an underground box with trees on top and wires running over and up to a pole above ground. After about minute of talk regarding the drawing on the board, with lots of disagreements, Wayne says, "Yoooo hooo. Is this conclusive? Does this idea seem OK with everybody?" This is followed immediately by a loud interruption. Above the voices can be heard: "OK, someone has to sum it up. . . who's summing it up?" Meghan, above the others: "Now Aaron will sum it up, the way this meeting has gone." Aaron continues to sketch. Meghan: "That's good Aaron."

When Aaron does not sum up the meeting, Matt volunteers. Meghan rejects Matt as the summarizer. Rachel reads from her paper. An idea about tree stumps comes up and the group talks about barricades and guns. The meeting ends.

### Observations

The children in this group are capable of much more imaginative thinking than we see here. They should be bubbling over with new ideas. Instead, they are drawn to what they perceive as the mistaken thinking of others. They listen to every idea for defects. It seems important, almost compelling, for them to point out the flaws. This has two observable consequences. First, most of their ideas, other than the very conventional ones, tend to be discarded. Second, the negative comments lead to heightened tension, anxiety and defensive responses. As time goes by, idea initiators become more cautious so they will not have to defend their ideas and can avoid anxiety. The group's thinking drifts toward the conventional. In the end, rather than lifted by the pleasure of connection-making and new thinking, the group appears exhausted, frustrated and defensive.

The biggest discounter in the group, the boy named Matt, is not one of the primary contributors of ideas. He spends most of his time discounting the ideas of others. Being good at generating new ideas requires a different mind-set. In finding flaws, our

energy stops when we see a defect. We reduce the anxiety that arises as we see the mistaken thinking in others, but our thinking stops short of helping to generate a new idea that might solve the problem. Instead, we choose the route of anxiety avoidance, not the riskier path of making new connections.

It seems evident that the kids in this group were not handicapped by any lack of knowledge. They are aware of bears and their habitat. They know about repellents and they have some knowledge of electricity. Their tendency toward conventional thinking seems to be caused by a self-imposed caution reinforced by the negativity in this meeting. Making creative connections was doomed early when Matt declared such thinking off limits: "Guys, come on you are getting a little crazy here." Each participant processes Matt's caution as a discount. The 'rational' conclusion each draws is that absurd thinking is not acceptable. Their output of less than a dozen ideas in twenty minutes of brainstorming is far off the mark. We next see a fourth grade class generate three times that number of ideas in the same time frame.

#### Fourth Graders

The fourth graders are working on the same grizzly bear problem but in this case using the Synectics process.<sup>6</sup> This class is working with an adult facilitator. Their teacher, who is also in the room, is observing but not participating. The children have been introduced to Synectics for the first time.

The presence of adults and other obvious differences prevent us from making a direct comparison with the seventh grade students. That is not our purpose. The purpose is to illustrate that children of this age can produce some remarkable connections when discounting is not allowed. The big difference between the two groups is their willingness to take risks. We have seen this phenomenon repeated hundreds of times over the years with all age groups, and based upon that experience, we assume that the seventh graders would have made the same bold connections if the discounting had not been present.

As the fourth grade children begin their task, we notice that the ideas are similar to those offered by the seventh graders. The primary difference is the reception. There is no discounting and each idea is being written down just as it was offered. As the children realize that the facilitator will protect them, the ideas begin to flow and the children make several daring and wonderful connections. The session starts off with an idea that came up in the earlier meeting with the seventh graders--honey. Let's see how the Synectics facilitator handles it.

John: Mine has already sort of been invented.

Facilitator: That's OK. Let's have it.

John: Honey!

Facilitator: What are you wishing?

John: Wish we could use honey to...wish we could use like liquid honey. Sort of make it a little wetter so that it will blend in and then put it around the transformer like near trees and stuff; spray it on trees and the bear will go for those.

The Facilitator is careful to write down exactly what John said about honey. Then he paraphrases to make sure he has understood John.

Facilitator: "So attract him away from the transformers by spraying the honey on other things...am I right?"

John: Right.

The kids come up with several more familiar ideas. The facilitator decides to take them on a mental "excursion."<sup>7</sup> "We're going to put the problem out of our minds [he covers the flip chart with a blank sheet of paper] and to the extent you possibly can, I want you to forget about the problem that we are working on." The facilitator tells the group that he now wants them to select a fun place and take a trip there in their minds. "The place you go on your imaginary trip can be anywhere in the world."

After a few minutes of "traveling," the children are asked to describe their adventures. Some selected Disney World, while others visited London, Honolulu and a Kraft cheese factory where one of the mothers worked.

For example, Jeremy: I would see the guards at Buckingham Palace.

The facilitator then takes the kids back to the problem. Christine immediately has an idea: "There would be a circle that would turn around when the bear steps on it [and gets] you know like dizzy.

Facilitator: Where did you get that idea?

Christine (Pointing to the light fixtures in the ceiling): I saw the circles around on the ceiling so I got the idea.

Facilitator: I love that idea. So the bear would step on this thing and it would start spinning and he would get dizzy.

Jeremy: I got this idea from the queen's guards marching back and forth. You would have things to distract the bear by moving around and around. Things moving in front of each other with their arms waving (Jeremy gestures with his arms).

Christine's idea of making the bear dizzy is a wonderful example of the connection-making potential of children. During the excursion, she noticed that the lights, which were recessed into the ceiling, created a soft interesting glow. She used that material to come up with an original concept. She was available to use any image that came to her mind.

Under normal circumstances, she might have been scolded for daydreaming. Here she used her natural speculativeness in exactly the way we have in mind. She picked an apparent irrelevancy and connected it with the problem to generate a beginning new concept. Jeremy's idea shows how well kids this age grasp the process. He had a novel idea and knew exactly how he had manufactured it. He connected the palace guards marching back and forth with his idea of distracting the bears.

The protection afforded by the facilitator helped the children become available to a wide range of possibilities and gave them permission to make connections and speculate freely. The environment was non-threatening. Anxiety was at low ebb. The kids were able to use imagination and first rate connection-making skills to produce new ideas. They seemed free to offer any idea to the group no matter how absurd.

To be sure, when this session began there was an occasional evaluative comment. For example, when Diego said, "Make a strong barbed wire fence," John immediately said: "That might hurt the bear though." If such comments were allowed or even encouraged, the interpersonal field<sup>8</sup> of the group would become unsafe. This group, like the seventh graders would have become anxious and defensive. But the facilitator protected Diego's idea; "We will work around that problem. If it hurts the bear then we will change it a little bit." John and the rest of the group were encouraged to come up with ways to make barbed wire safe. The group quickly got the idea that anything they thought about would be deemed acceptable no matter how incomplete or full of flaws. In less than twenty minutes, these children had generated more than 40 ideas. It is important to note that these kids were from an average fourth grade in a large urban school district. We do not think this level of performance is unusual. The critical factor is whether the children feel safe. Even the hint that their ideas will be challenged is enough to limit risky connections.

What we have learned from this group of children and countless others is that every group has a defensive interpersonal field until actions demonstrate that it is safe. Then, the group lets down its guard and can shift to experimental thinking. Having an adult lead the children obviously made a great deal of difference in their behavior. However, having an adult facilitator does not always guarantee effective results, as we shall see.

In this next case, we observe a classroom teacher who is trained in the Synectics process. She is working with a sixth grade class in a school setting. The teacher is new to this class. The children are working on the same grizzly bear problem. There are some very important and subtle ways in which this teacher is misreading the effects of her

transactions with the kids. She is unaware that her interactions, while intended to help the children search for imaginative connections, are actually shutting them down. We see her, in a kind of teasing manner, having the following exchanges just at the beginning of a creativity session:

First student, with hand raised.

Teacher: What?

Student: I wish the bears would get glasses.

Teacher: You wish the bears would get glasses. OK. OK. I wish, I'm going to put that up here, the bears, my writing is going to get worse and worse and I can't spell anything, good thing they can't see this with their glasses. And then they wouldn't think that it was another male? I wonder if the grizzly bear knows what it looks like? I wonder if he's ever seen himself in a mirror?

Second child, hand raised.

Teacher: What?

Child: I wish they could bury it, so they couldn't get to it.

Teacher: I wish they could bury it. The bear or the transformer? The transformer?

Child: Yeah, bury it. Put it under the ground.

Teacher: Bury it, what else? That's great.

At this point, the class begins to fidget and there are no sterling ideas. The children stop making connections. The teacher is puzzled about why the class did not respond as expected. Let us examine the interactions. In the first exchange, the teacher is unaware that she has begun to speculate for the children. By doing so, she inadvertently sends them a message: "I will do the connection making." The children instinctively comply. The net effect is that the teacher works harder and harder and the children do less and less. When she said, "The bear or the transformer?" she believed that she was helping to loosen up the group and encouraging them to be playful. The effect was not the same as the intent. The



child who suggested burying the transformer did not offer another idea for the remainder of the session.

### Breaking the Cycle of Discounting and Inhibited Connection Making

The cycle we saw earlier with the seventh graders, discount followed by defending, can be broken. Getting there requires having an awareness of the negative consequences of discounting and a safe, repeatable process to make visible the anxiety that may be hidden under defensive maneuvers.<sup>9</sup>

At Synectics, we have experimented with a number of “built-ins” to overcome the anxiety of connection making. One of the earliest was to label as “wishes” all initial contributions to the meeting. We discovered years ago that when we encouraged wishing, rather than opinions or conclusions, the effect was an immediate reduction of skepticism and competitiveness (Prince, 1970).

Let us illustrate the importance of wishing by observing a teacher working with a group of sixth graders. The teacher has been trained in the Creative Problem Solving process. In this case, the children are attempting to search for new solutions to a familiar problem--losing the Thermos™ bottle cap. In contrast to the speculative wishing we saw earlier with the fourth graders, this teacher is insisting that the kids provide well thought out ideas. She challenges them and questions each idea as it is offered. She is not aware of the effects of her transmissions on the children. Before long, she begins to have trouble with the group.

Student: Put your bowl in it after you're done.

Teacher: Put your bowl in it. . .

Student: Yeah.

Teacher: What do you mean?

Student: Like after you've finished, like if there's soup in it, put your whole bowl inside it.

Teacher: OK, OK. You put your. . . I guess I still don't understand. The bowl. . . you would eat the soup out of?

Student: Yeah. Keep soup in the bowl or something. Then, after you're done you put it inside.

Teacher: OK. If it were big enough you could, yeah. OK. I hadn't thought about that. OK.

Later, this teacher begins to have trouble with the group.

Teacher: OK. So you have to make it big so it's easier to clean. OK. What else?

Would you stop please.

OK, what else?

A few moments later:

Teacher: Excuse me. Would you come and sit in this chair just for a minute please. Thank you.

In the first incident, we see the teacher having a problem with actually hearing an idea. The teacher seems to challenge the children when she does not understand. She comes across as somewhat skeptical of ideas that are new or unfamiliar to her. The effect is to send a message to the group that their ideas have to be clear, fairly well thought out and sensible before she will accept them. She routinely presses each child to give more details. In some cases, the ideas are just beginning thoughts and the exercise has a punishing feel about it. She tends to warn the kids rather than ask their permission or invite them to participate: "OK, I want you all to be listening to these ideas because we're going to talk about adding on to them or combining them after we're finished with everybody's group." The reaction of the children is to act out. They eventually stop offering any ideas at all.

### Building in Absurdity

We have found over the years that groups become less speculative when we insist that each new idea be precise and well thought out (Prince 1982a, 1982b, Weaver, 1993). This is seen as a challenge and the often-observed response is retaliation from the group. We see such a response above in the occasional acting out of several of the children in the group. To get away from an insistence on precision in the beginning of idea generation, we encourage absurdity. To warm up the group, we often use a technique called the “discontinuous pass along story.” This is a way to practice the fun of absurd connection making without anxiety. It works as follows: One person tells a few sentences of a story out loud to the group and then abruptly puts a twist into the developing plot. She passes it to someone else who must paraphrase what she said from the point of the plot twist and then add a few lines. That person then puts in a twist of his own in the story and then passes it to someone else.

The exercise continues until everyone has tried the plot twist a few times. This exercise is an eye opener for many people. They find themselves blocking when it comes time to put a twist in the story. Their creative ability is hijacked by anxiety and they draw a blank. We want our participants to develop an awareness of where that anxiety comes from and its effects on their thinking process. With a little practice, most succeed in doing this and most become good at putting a twist in the story. Those who don’t succeed have had it pounded into them that they must not make a mistake. Fear and anxiety force them to choose the path of avoidance rather than stretching for new connections.

This is a technique that works wonderfully with children. Several teachers in our workshops have experimented successfully with it as an aid to helping their children write creative stories.

### Listening for Meaning v. Listening Defensively

Our amygdala, a key component of the limbic brain,<sup>10</sup> equips us to listen defensively. We are acutely aware of the potential threat of each message we receive. Even seemingly innocent ideas such as those expressed by the seventh graders regarding the grizzly bear repellent were interpreted as threatening. Recall Matt warning that the group was getting a little crazy--actually a preferred state of thinking when we are only speculating. Our amygdalas automatically scan the input and prompt us to react even before the rationalized, ordered thought can be formed. We know this from talking to hundreds of participants in our experimental workshops. When we ask them why a seemingly innocuous idea led them to discount it, they often can not remember why. . . "it was just a feeling or a sense I had." The feeling is then followed by a rational but negative comment. Most of the time, the person doing the discounting disclaims any negative intent. The person receiving the discount almost always sees it as negative and responds accordingly.

Effective listening in a creativity meeting requires us to listen in an entirely new and different way. We must listen to the other person's idea for understanding and ultimately to award it meaning. The implication is that if we listen so that we understand and award meaning, we are helping the other person's understanding as well as our own. We are also keeping our own anxiety in abeyance along with that of the other participants. To accomplish this, we need to speculate, guess, invent, experiment and create connections along with the person we are trying to help by listening. This kind of listening demands modifying much of what we believe is good listening, i.e., being good at being critical, judgmental, evaluative and listening for flaws.

In order to get kids warmed up to the task of listening without criticism, we pair them up and have a problem solving exercise without discounting. One of the pair "owns" the problem and the other is there to help solve it by generating new ideas. The problem owner answers a few simple questions, e.g., why is this a problem and what have you already thought about or tried in the way of solving it. No questions are allowed outside of

these pre-set questions. The other person then offers an idea. No matter how absurd the idea, the problem owner must find three benefits for it. Then, he or she may point out concerns but only as a “how to.” For example, one child might offer the idea of inflating the transformers so they would float above the grizzly bear’s reach. Her partner, after giving three benefits, would have to state any concerns in this fashion: How to avoid collisions with birds and other flying objects. This transforms the criticism from the negative (birds would-be electrocuted) to the positive (ways to avoid mid-air collisions).

Consider how the meeting of the seventh graders would have been different if each student had noted down flaws when they heard them and then invented in their minds ways to overcome the flaws. The group would have felt free to speculate without fear of being rejected. Ideas that were discarded might have been developed into more original solutions. The energy that went into defending ideas could have been applied to new and unusual lines of thought.

#### Implications for Teaching

From our study of creativity and learning we know that the essential building block for learning is connection-making. This process can happen through teacher directed learning where the teacher is in charge of the process and focuses on having the student grasp and remember the correct answer. Another, very different, teaching approach is known as discovery learning. In this process, the person is led to make the connections herself, obviously a more involving and satisfying way of learning. The emphasis is on making the correct connections and getting the right answer.

Below we present a brief description of several teaching methods implemented by Marilyn S. Yas, a Needham, Massachusetts elementary school teacher who spent one of her sabbaticals working with Synectics, Inc. In the approach we have developed along with Marilyn Yas, managing and teaching the discovery idea is carried further. The emphasis is still on making the correct connections and getting a right answer, and the emphasis is also on the process, the sometimes-messy trial and error process necessary to reach a

correct answer. The objective is to help the child experience her own trial and error without evoking the anxiety of having to be instantly correct. That fear of being wrong while working toward a right answer triggers anxiety and leads to avoidance of the thinking process itself, i.e., Inhibited Connection Making.<sup>11</sup>

The techniques seen here have extended the boundaries of discovery learning. Marilyn's approach is based entirely upon the need to reduce anxiety and free children to stretch for connections. We have spent many hours observing, video taping and actually working with her children. The material presented here is taken from our notes and observations of her classroom teaching. We might describe her work as an antidote for classroom anxiety.

Here is a wonderful example of what we mean from a first grade class a few years ago. We will call it the lesson on Understanding Maalox and "Real." Miss Yas stops reading from the *Velveteen Rabbit* and gently asked her first graders, "What is real?" The children were seated on the floor around her in a kind of curious knot, as one might see them watching something quite fascinating such as a puppet show. There is an incredible degree of openness in this classroom. It seems more like visiting a family about which you later say, "Weren't they the nicest people you ever met."

Child: People are real.

Miss Yas: Can you say more about that?

Child elaborates.

Miss Yas: Good, good. Would someone else like to tell us what real means?

Child: Ride a bike.

Miss Yas: So take a risk?

Another child: When you're real you can't turn into a stuffed animal.

Miss Yas: Tell us some more.

Child: You can move your hands and walk.

Child, very gently: Miss Y, what does real mean to you?

Miss Yas: What does real mean to me . . . [Miss Yas hesitates, then says, "can you give me some wait time?"] After a moment, Miss Yas responds.

Miss Yas: Real means to me something different. This just my thought. I'm not talking fact, just my opinion, OK. Real means to me people doing things, acting in ways they really want to be . . .

Child, gently: That's a nice thought for real.

Miss Yas: Thank you. It is hard to describe. I'm going to think about that. Yeah . . . it's hard.

Another child: When I got a new toy, I called my friend up. I couldn't describe it. . . .it's hard.

Miss Yas: Sometimes it's hard to describe things. Sometimes we can draw pictures.

Another child: Sometimes my family doesn't understand my Dad when he is chewing Maalox.

In this sequence we see the teacher struggling with a difficult concept. Her complete openness with the children about her own thinking helps them to see that it is OK to be confused. As she works aloud through various meanings, the children engage with her and each other. They are fearless about sharing their thoughts.

Marilyn Yas has invented ways of applying Synectics findings and methods to her classroom teaching that are quite remarkable. Let us look in on her current class, one of several kindergartens in her school district of Needham, a well to do suburban town near Boston, Massachusetts. We are focusing on it because the children who attend her particular kindergarten class are behaving so differently from their peers. It is a day in March and school is about to begin. The children are, by rule, lined up at the door of their rooms ready to pass in quickly, quietly and cooperatively. There is the usual squealing, showing, laughing and horseplay except in the case of this one class. Here the twenty students

stand, quietly talking and waiting for the door to open. This group, that we will call, K1, stands out because they do not seem to be infected by giggles and horseplay.

As we follow them into their room, there is a cheerful, relaxed undertone of conversation. Most say, "Hello, Miss Yas," as they quietly go to their lockers, hang up their raincoats and deliver notes from home into a large box labeled "N" (the box with the label is an invention of the children) and go to a seat of his or her choosing. One little girl has a story to tell Miss Yas and as these two converse, the rest of the class moves into small groups and several quiet conversations begin. These continue for a few minutes until Miss Yas and Vera have finished their meeting.

Miss Yas then says good morning to all and suggests that they plan their day. She has written on the board a list of all the things they want to accomplish in that session. "What shall we do before our snack, and what after?" She asks. There follows a discussion in which the children decide. If one has trouble reading an item on the list, another helps. They negotiate most differences, but if they hit an impasse, they settle it by vote. Then they implement their plan. This daily exercise develops a sense of time and planning ability, and more importantly, an awareness of being in charge of themselves.

K1 is an unusual class. Eighteen of the 20 children have taught themselves to read. At "sharing time" when the children take turns telling of experiences, it is not unusual for two or three to collaborate and present a dance, complete with music or other creative presentation, a high risk adventure for a five year old. Some write 'books' which they read to the class. A music teacher, a physical education teacher, and a librarian, who give special training, visit K1 once a week. Each of them has taken Miss Yas aside and remarked on ways in which their experience with K1 is different from other kindergartens. They are impressed with the unusually long attention span of the children, their high level of enthusiasm and responsiveness, and finally their own level of enjoyment in working with these children. There is no need to spend any energy on control or discipline or settling arguments.



An observer would note a marked difference in the way K1 children behave while walking in the hall and waiting to board their busses at the end of the day. While for the other groups there is the usual hubbub, pushing, giggling and competition for first place in the line, the K1's are calm and in quiet conversations with each other. Early in the year they problem-solved about taking turns being first so that is not an issue, and because they are used to being in charge of their own behavior there is no need to act out.

### Field-Based Teaching

With careful attention to the interpersonal field she creates for children, Marilyn Yas has implemented an imaginative new way of relating to her charges. We call it Field-Based Teaching. She creates an interpersonal field in her classroom that respects the fundamental need of each child to develop autonomy and responsibility for him or her self and respect for the needs of others. We realize that every teacher in American would claim to do the same. Yet, this classroom in Needham, Massachusetts demonstrates how far most of us miss the mark. Her classroom is an emotional and intellectual field that brings out the best in her students.

Perhaps the best way to illustrate Field-Based Teaching is to describe a typical interaction in K1. The children have been encouraged to identify problems and do problem-solving from the first day. They feel free to bring up whatever they think might be useful to them or the group.

Bobby: When the parents come in and sit in the back it makes it hard to work (there is general agreement that it interferes with their work).

Ms. Yas: Well, if we would rather parents did not come in at the end of the day, what can we do about it?

Timmy: We can lock the door.

Ms. Yas: Yes, good, that would work (and writes it on the board).

Sally: We could each ask our mothers not to come in.

Ms. Yas: Yes, that's a good idea and it would work too (and writes it).

Eddie: It might be hard to remember to tell each mother. (There follows a brief discussion of this.)

Dan: We could make a sign that says 'Do not Enter' and hang it on the door.

Ms. Yas: That is another good idea (and as she writes it up there is general agreement that that is the thing to do).

Ms. Yas: If that is what we want to do, let's make the sign. (Dan gets some drawing paper and a crayon) How do you spell "Do?"

Ms. Yas: What do you think? Can you sound it out?

Dan: Duh, that sounds like a D.

Ms. Yas: Do you want to try that?

Dan: (writes a "D" and then says) "uue." That's a u.

Ms. Yas: Yes, that sounds right. Do you want to try it? (Dan, after consulting the alphabet on the wall, writes "U")

Sam: There is a "do" in my reader and it is spelled DO, so that should be an "O".

Ms. Yas: Are there any other letters that sound right? (The class finds several and Ms. Yas writes them all on the board.) The English language is kind of crazy the way they don't always use the letters you would expect--for instance DEW sounds just like DU or DO. How are we going to decide which is right for the sign?

The class decides to use the spelling from the book and goes on to work out the spelling of "not disturb." The sign is placed on the door and solves the problem. Every problem that arises is worked on in the same way, with the children in charge of developing the solution and at the same time learning the honorable process of connecting through trial and error, allaying the anxiety of mistake-making, initiative, and coming to appreciate the value of respectful collaboration.

Field Management in the Second Grade

Marilyn Yas used the same child-respectful process in teaching her second grade class and it paid the same sort of dividends in bringing out the best in the seven-year-olds. Here we observe the first class of the year. Ms. Yas gathered her children in a circle at the front of the room before a large easel pad. After introductions she said, "You know, learning things can be a risky business. Can anyone guess why it can feel risky to learn something new?"

The children quickly identified that the risk lay in making mistakes, being wrong and not knowing the answer.

"Yes, that is why learning can be risky and during this year I want us to learn to take a lot of risks. Now, what do you want to risk learning this year?"

There was no hesitation. The children covered everything that would be taught and a good deal more while Ms. Yas wrote each item on the easel pad. Right from the start, she wanted to bring into their awareness that they would have a say in what would happen in class, that learning involves trial and error and can make a person anxious.

Next, she said, "We want to have a lot of fun this year and sometimes when we are having fun we get noisy and that is OK, but we need to be thoughtful of the classes next door to us, so we need to invent a way to keep us from getting too noisy. Any ideas on how we might do this?"

The children's solution had two parts. Whenever one noticed that they were getting too noisy, he or she would hold up her hand with two fingers giving the victory sign. As others noticed it, they would hold up their hands too. If they were too absorbed to notice, then the 'noticer' would go to the light switch and turn the lights off and on. They used this system effectively throughout the year.

Next came seat 'assignments.' The small desks and chairs were arranged in the traditional neat rows. "We will be working together a lot so I want each of you to choose a

desk and chair and move it together with two or three other people you would like to work with.”

This was another step in building a field of self-determination. Throughout the year these small groups learned relationship skills. It was Ms. Yas’ practice to write up on the board all the tasks of the day. Each group decided in what order they would do them. They not only studied independently, but also wrote and read aloud stories to the whole class. They did problem-solving as groups and sometimes as a whole class (How to stop bullying on the playground?). The small groups of desks became known as “Think Tank” after the name given to the creative problem solving system they learned.

Children could move their desks to join another group, or do some work with one or two other companions whenever they wished. They were in charge of choosing teammates. When their self-assigned curriculum tasks were completed, the children had “free time” to work on a project they had selected for themselves and upon which they would give a presentation when completed. Sam chose to build an apartment complex for Smurfs; Janice did research to learn all she could about AIDS. Every step of the way Ms. Yas was governed by the idea of putting each child in charge of her or himself. She made it clear by modeling that each child had two responsibilities: (1) To pay attention to his own thoughts, feelings and needs, and (2) to respect the thoughts, feelings and needs of his classmates. As a result of emerging skills of problem-solving and negotiation, the class did indeed become a self-organizing system. Learning activity was continual whether Ms. Yas was ‘watching’ or not.

This allowed a different quality of relationship between Ms. Yas and her students. She was able to spend most of her time in intimate interactions with one or two or three children at a time. She could model respectful listening, responding and coaching.

After a few weeks the children put a sign on the door of their classroom that read: “RISK ROOM.”

### Organizing/Learning Procedures

On one of the days we observed, Ms. Yas led the children in learning a number of creativity strategies originated at Synectics, Inc. One, named "Think Tank," is a problem-solving procedure that includes a way of stimulating new connections and a constructive way to evaluate ideas and situations. The children learned to use these techniques in groups and by themselves. At the end of each day they were invited to evaluate what had happened, itemizing those happenings they liked, and those they wished had been different. If the differences were serious, they problem-solved to invent ways of changing the bothering situation.

There were a number of observable outcomes such as markedly greater creativity in their writing, better self-management and excellent collaborating. One of the most remarkable consequences was in the effect on four Special Needs children. At the beginning of the year there were four such children in the class of twenty-four. Two had serious behavior problems. All were thought to need outside help. One, who we will call Jerry, needed outside help in reading, organization, occupational therapy, physical therapy, learning disability, and behavior. These were continuations of his first grade program (his first grade teacher believed he was mentally retarded). Ms. Yas and his parents decided to eliminate all outside help to avoid reinforcing Jerry's belief that something was wrong with him. At the end of a year, Jerry and the other three special needs children had 'found' themselves and no longer needed special treatment. These children are now in seventh grade and continue to do well.

Margaret Wheatley (1992) suggests that each of us is a bundle of potential and the interpersonal field determines which of our talents will develop. For Marilyn Yas this is Gospel. From the first day of class, she is clear about her objective: To nurture in her students a self-organizing system, a system that would enable the children to take charge of all of the learning and relating opportunities of the year. She, as teacher, focuses on the

children, listening and looking for rewarding directions originating with them, and she makes every effort not to control them. They are to be in charge of themselves.

Dr. Murray Bowen (1985) in his research into family systems identified two instinctually rooted drives: One toward independence, individuality and autonomy; the other toward togetherness and belonging. When these needs are ignored there is reactivity and defensiveness that interferes with thinking and learning and relating. When a child does not feel meaningful, his or her learning, creating and connection-making suffer. The constant goal of Marilyn Yas is to model and create opportunities for the children to experience connection making in every possible way--to learn, to initiate, to create, to relate to each other, self and to her in a respectful way.

Her dream is to have every child be and feel meaningful throughout the school day. This would seem a worthy goal for all teachers.

#### REFERENCES

- Bohm, D & Peat, D. (1987). *Science, order and creativity*. New York: Bantam Books.
- Bowen, M. (1985). *Family therapy in clinical practice*. Northvale, N.J.: Jason Aronson Inc.
- Brazelton, T. B. (1991). *Earliest relationship: parents, infants, and the drama of early attachment*. New York: Perseus.
- Brazelton, T. B. (1994). *Touchpoints: your child's emotional and behavioral development*. New York: Perseus.
- Goleman, D. (1995). *Emotional intelligence*. New York: Bantam.
- Gordon, W. J.J. (1961). *Synerctics*. New York: Harper and Row.
- Gottman, J. M. (1994). *Why marriages succeed or fail*. New York: Simon & Shuster.
- Isaksen, S. G., & Treffinger, D. J. (1985). *Creative problem solving: The basic course*. Buffalo, NY: Bearly Limited.

- Jarman, B. S. (1986). *You can change your life by changing your mind*. New York: Harper Collins.
- Kegan, R. (1982). *The evolving self-problem and process in human development*. Cambridge: Harvard University Press.
- Land, G. & Jarman, B. S. (1992). *Breakpoint and beyond: mastering the future today*. Leadership 2000.
- Lane, S. P. (1991). *The examination of impasse in small group transactions using interaction analysis*. Unpublished doctoral dissertation. Boston, MA: Boston University.
- LeDoux, J. (1998). *The emotional brain: the mysterious underpinnings of emotional life*. New York: Touchstone Books.
- LeDoux, J. (1998). *The emotional brain: the mysterious underpinnings of emotional life*. New York: Touchstone Books.
- Lefton, R. & Buzzotta, V.R. (1987-88). Teams and teamwork: A study of executive-level teams. National Productivity Review, Winter, 7, 7-19.
- Mullahy, P. (ed.). (1995). *The contributions of Harry Stack Sullivan*. Northvale, N.J.: Jason Aronson Inc.
- Parnes, S. J. (1967). *Creative behavior guidebook*. New York: Scribners.
- Parnes, S. J. (1973). Evaluation of training in creative problem solving. In: M. Goldfried & M. Merbaum (Eds.). *Behavior change for self-control* New York: Holt, Rinehart & Winston.
- Parnes, S. J. (Ed.). (1992). *Source book for creative problem solving*. Buffalo, NY: Creative Education Foundation.
- Prince, G. M. (1970). *The practice of creativity*. New York: Harper and Row.
- Prince, G. M. (1982a). Synectics. In S. Olsen (ed.). *Group planning and problem-solving methods in engineering*. New York: John Wiley & Sons.

- Prince, G. M. (1982b). Synectics: Twenty-five years of research into creativity and group process. Journal of The American Society for Training and Development, 91-103.
- Schnarch, D. (1997). *Passionate marriage*. New York: W.W. Norton.
- Smith, B. (1993). Effect of discounting on the productivity of creative problem solving groups. Unpublished doctoral dissertation. Boston, MA: Boston University.
- Stern, D. N. (1985). *The interpersonal world of the infant: a view from psychoanalysis and developmental psychology*. New York: Basic Books.
- Stern, D. N. (1992). *Diary of a baby*. New York: Basic Books.
- Sullivan, H. S. (1953). *The interpersonal theory of psychiatry*. New York: W.W. Norton.
- The basic course. Buffalo, NY: Bearly Limited.
- Treffinger, D. J. & Parnes, S. J. (1980). Creative problem solving for the gifted and talented. Roeper Review, 2, 31-32.
- Treffinger, D. J. & Sortore, M. R. (1990). Creative problem solving: the need, the process, the metamorphosis. The Prufrock Journal of Secondary Gifted Education, 2 (2), 6-15.
- Treffinger, D. J. (1983). George's group: a creative problem solving facilitation case study. Journal of Creative Behavior, 17, 39-48.
- Treffinger, D. J. (1995). Creative problem solving: Overview and educational implications. Educational Psychology Review, 7 (3), 301-312.
- Treffinger, D. J., Isaksen, S. G., & Firestien, R. L. (1983). Theoretical perspectives on creative learning and its facilitation: an overview. Journal of Creative Behavior, 17, 9-17.
- van der Kolk, B. A. (1997). Trauma, memory and self-regulation, clinical applications of current research. Workshop.
- Van Gundy, A. B. (1981). *Techniques of structured problem solving*. New York: Van Nostrand-Reinhold.



Weaver, W. T. & Prince, G. M. (1990). Synectics: Its potential for education. Phi Delta Kappan, January, 378-388.

Wheatley, M. J. (1992). Leadership and the new science: learning about organization from an orderly universe. New York: Berrett-Koehler Pub.

#### ENDNOTES

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<sup>1</sup> The idea of field comes from quantum physics. In physics, forces can be described by fields that mediate interactions between separate objects. At its core, the theory holds that subatomic particles interact as they emit and absorb photons (minute packets of electromagnetic radiation), playing a game of "catch." The sub-atomic matter exists as tiny, invisible fields of energy, bundles of potential. Only when two such fields come together, do their potentials come into being (for additional information, see Wheatley, M. J. 1992). We see this as a metaphor explaining the relationship between people and contexts. We know that the interpersonal field around us is made up of information generated by everything and everyone in that field. As this external field of information and emotion envelops a child it interacts with his evolving internal field and the interaction determines his actions and reactions and over time his behavior. In turn, his behavior influences the general field around him.

<sup>2</sup> The term, discount, was coined at Synectics, Inc., Cambridge, Massachusetts to include all of the verbal, tonal or non-verbal cues that tell us we are being attacked (Prince, 1982b). The work at Synectics, Inc. was the first to pinpoint the negative effects of discounting on creativity sessions (Prince, 1982b). Many of the techniques for dealing with discounting in meetings have evolved from this early discovery, including video taping and providing groups with feedback on their behavior.

<sup>3</sup> The areas of the cerebral hemispheres related to the hypothalamus constitute the limbic lobe, first considered as a complex by Paul Broca, the nineteenth century anatomist. This region of the brain is usually called the limbic system and consists of the following:

Cingulate and parahippocampal gyri, the hippocampus, the amygdala, the septal and pre-optic nuclei, and various connections. The hypothalamus, with the pituitary gland, controls the emission of hormones, body temperature and maintains blood pressure and the rate and force of the heartbeat. The hypothalamus also controls the body's need for water and electrolytes (for more information, see LeDoux, 1998).

<sup>4</sup> Joseph E. LeDoux (1998) and others suggest that emotion activated by way of the thalamo-amygdala pathway need not involve the neocortex. Emotion activated by discrimination of stimulus features, thoughts, or memories requires that the information be relayed from the thalamus to the neocortex. Such a circuit is thought to be the neural basis for cognitive appraisal and evaluation of events.

<sup>5</sup> For additional information on CPS, see Isaksen and Treffinger (1985), Parnes (1967), (1973), (1992), Treffinger (1983), (1995), Treffinger, Isaksen and Firestein (1983), Treffinger and Parnes (1980), Treffinger and Sortore (1990), VanGundy (1981).

<sup>6</sup> For additional information on Synectics, see Gordon (1960) Prince (1982a), (1982b), (1970), Weaver and Prince (1993). CPS and Synectics have some similarities. Both, for example, are facilitator-led, encourage speculative thinking, discourage negative comments and promote teamwork.

<sup>7</sup> "Excursions" are intended to free up our thinking. This strategy, which was invented by Prince (1970) and Gordon (1961), literally forces us to "let the accidents happen" by departing from the problem at hand and stirring up images that are far removed. Then the facilitator brings us back to the problem and we force the seemingly irrelevant excursion material gives us an idea to solve the problem we are working on. By doing so, we are simulating what psychologists call "incubation," the stage of thought when the conscious mind gives over the task of thinking to the subconscious mind. The objective is to help groups break out of patterned thinking and logical/critical discourse. There are three simple steps in using *excursions*: (1) Put the problem temporarily out of mind. This en-

ables the group to get distance from the problem they are working on, and is no different, in principle, than saying, "Why don't you sleep on it." (2) Deliberately focus on apparent irrelevancy. The purpose of seeking deliberately irrelevant material is to generate surprising or unusual connections. (3) Force fit the irrelevant material together with the problem and allow your mind to invent a way of connecting them. Research confirms the power of taking a break from the problem at hand. Kirkwood's (1984) research showed significant gains when problem solving groups departed temporarily from the problem, focused on something unrelated and then returned to the problem.

<sup>8</sup> The idea of field comes from quantum physics. In physics, forces can be described by fields that mediate interactions between separate objects. At its core, the theory holds that subatomic particles interact as they emit and absorb photons (minute packets of electromagnetic radiation), playing a game of "catch." The sub-atomic matter exists as tiny, invisible fields of energy, bundles of potential. Only when two such fields come together, do their potentials come into being (for more information, see Wheatley, 1992). We see this as a metaphor explaining the relationship between people and contexts. We know that the interpersonal field around us is made up of information generated by everything and everyone in that field. As this external field of information and emotion envelops a child it interacts with his evolving internal field and the interaction determines his actions and reactions and over time his behavior. In turn, his behavior influences the general field around him.

<sup>9</sup> We have been experimenting at Synectics, Inc. with taping and providing feedback since the days of wire recorders 40 years ago (Prince, 1982b). Four decades of experience tell us convincingly that feedback can produce awareness. Awareness is the starting point. That same awareness can be accomplished by video taping children and then, with them, carefully looking at the tape. By stopping the tape every few minutes and asking the group some simple questions, the patterns and consequences reveal themselves. Some of

the questions we ask: Can you describe what just happened? How might this help open up our thinking? How might this close down our thinking? The objective is first to have the children describe what they see, and then to help them discover the consequences.

<sup>10</sup> The area of the cerebral hemispheres related to the hypothalamus constitute the limbic lobe, first considered as a complex by Paul Broca, the nineteenth century anatomist. This region of the brain is usually called the limbic system and consists of the following: Cingulate and parahippocampal gyri, the hippocampus, the amygdala, the septal and pre-optic nuclei, and various connections. The hypothalamus, with the pituitary gland, controls the emission of hormones, body temperature and maintains blood pressure and the rate and force of the heartbeat. The hypothalamus also controls the body's need for water and electrolytes (for more information, see LeDoux, J. (1998).

<sup>11</sup> See our discussion of Inhibited Connection Making in Part 1: Understanding The Inhibitors To Good Thinking