The SYSTEMS THINKING PLAYBOOK

by
Linda Booth Sweeney
& Dennis Meadows

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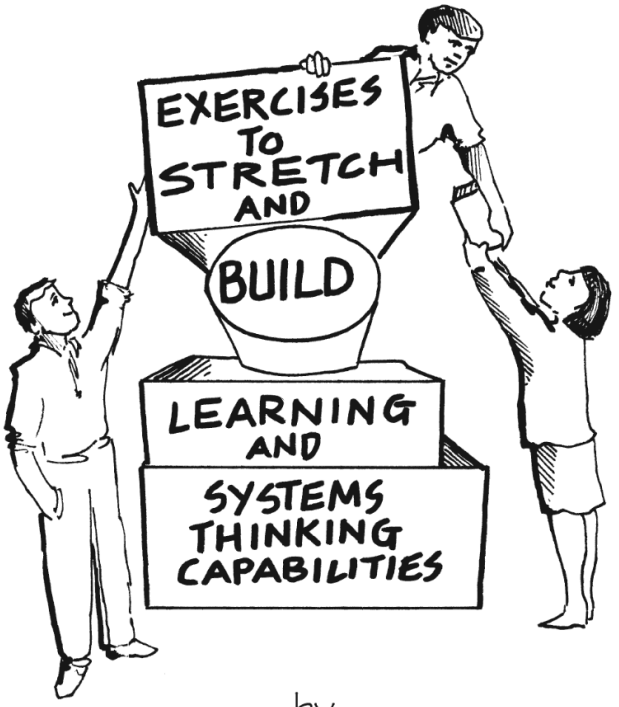

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In Appreciation

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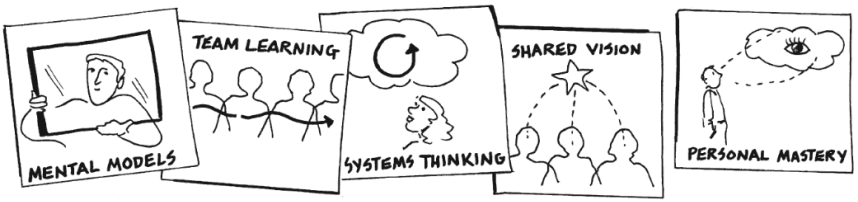


Guiding Ideas

Systems thinking is a broad term used to represent a set of methods and tools that focus on systems – rather than parts – as the context for defining and solving complex problems, and for fostering more effective learning and design. At its best, the practice of systems thinking helps us to stop operating from crisis to crisis, and to think in a less fragmented, more integrated way.

The games in this book highlight many of the concepts and ways or "habits of mind" associated with systems thinking, providing insights into these complex ideas in novel ways.

As our society enters the 21st century, we face an important educational challenge: How can we help people become engaged at all levels in learning how to think and behave in increasingly complex systems? More and more, practitioners and academics alike adhere to a simple premise when designing learning experiences: engage the mind and the body. In their powerful book, *An Unused Intelligence*, Andy Bryner and Dawna Markova warn that the Western culture of education leaves the problem-solving potential of our bodies virtually untapped. With this we wholeheartedly concur, and would add that the systems thinking and systems sensing potential of our bodies has been untapped as well.

What you experience using these exercises will depend on the skillful integration of key concepts, theory, techniques and experiential exercises; your familiarity with systems thinking concepts; and the insight and energy of the facilitator. Experientially, you will raise awareness of the "habits of mind" found in a systems thinker. And we invite you to have some serious fun while you're at it.

We have tried to set up the ***Playbook*** so that anyone – managers, CEOs, teachers, and professors, can read it and use it and find something meaningful. You don't need to be an organization development professional or trainer to use these exercises. In fact, we envision that, with a bit of preparation, a team will be able to open the ***Playbook*** and

work through the exercises as they might the exercises in Senge et al.'s *The Fifth Discipline Fieldbook* (1994).

As you use these exercises, write down your experiences. What worked? What got the "ah ha!"? What did not? Were there cross-cultural issues that needed to be considered?

The Ways Of A Systems Thinker

Our experience studying and teaching systems thinking has led to the definition of a systems thinker as someone who:

- Sees the whole picture.
- Changes perspectives to see new leverage points in complex systems.
- Looks for interdependencies.
- Considers how mental models create our futures.
- Pays attention to and gives voice to the long-term.
- "Goes wide" (uses peripheral vision) to see complex cause and effect relationships.
- Finds where unanticipated consequences emerge.
- Focuses on structure, not on blame.
- Holds the tension of paradox and controversy without trying to resolve it quickly.
- Makes systems visible through causal maps and computer models
- Seeks out stocks or accumulations and the time delays and inertia they can create.
- Watches for "win/lose" mindsets, knowing they usually makes matters worse in situations of high interdependence.
- Sees oneself as part of, not outside of, the system.

The exercises are meant to promote a greater awareness of these ways of thinking, seeing and interacting with the world. They are best used within an inter-related and reinforcing design which covers theory, concepts, and models, and includes a relevant and detailed debriefing of the participants' experience.

The Role of Games in Teaching Systems Thinking

Whether you played them in your backyard when you were a kid, or on the front stoop, or in a gym, you probably have pleasant memories of fun times involving many different games — Checkers, Hide-and-Seek, Tag, and other initiatives that you and your friends made up. Because games are enjoyable, many people suspect that game-based training isn't serious. After all, isn't learning supposed to involve earnestness, hard work, and serious expressions?

Maybe not. According to *Psychology Magazine* (July/August, 1998), the playfulness inherent in games "makes them psychologically truer even than everyday life. Games solve major crises, train war heroes, and civilize us all. What the world needs is not less time for playing games, but more." Games permit us to learn about complex systems while we are interacting with others. They offer the chance to make mistakes without great consequence. And they are fun.

Games can:

- Reveal an individual's or group's unconscious way of interacting and solving problems.
- Illustrate the power of habits, paradigms and values in identifying problems, gathering data, and making decisions.
- Replicate the structure and behavior of reoccurring patterns of behavior — aka, systems archetypes.
- Offer a shared experience of a behavior or problem that can then form the focus of further modeling exercises.
- Help create a non-threatening environment in which participants test theories of effective social behavior and evaluate real decision options. In a game it is possible to make a big mistake, but walk away without enduring consequences.
- Engage participants who have a wide range of learning styles.

These special features of games have become even more important over the last few years, as the nature of teaching has changed. In the past, educators could spend two years giving students a masterful command of system dynamics. Now many people will devote only a few days to formal study of system dynamics and systems thinking concepts. Clearly, the concepts and skills that can be conveyed in this drastically reduced time period are very different from those offered through formal

high school or college-level classes. But games, appropriately selected and sequenced, can still let us accomplish a great deal of learning.

Games can facilitate learning in two ways: through discovery or by confirmation. With discovery, players are given the rules of the game and then, typically, are surprised by behaviors that emerge during the play. Under these conditions, players can learn a lot by making mistakes, and sometimes, failing. For example, in the **Community Maze** exercise players discover the correct path only through making mistakes.

Under these conditions, players typically make many mistakes; often they fail in achieving their goals. Their errors also become the source of valuable insights about teamwork and communication. In **Space for Living** participants often mistakenly persist in a behavior that formerly was successful, but subsequently fails to satisfy their goals. After conditions have changed, participants' discovery of their mistakes, and their efforts to develop a new strategy are the essential learning opportunities of the game.

When a game is played in confirmation mode, players first learn new behaviors, skills, and knowledge. Then they play the game as an opportunity to practice their new understanding and demonstrate, or confirm, its effectiveness. Under these conditions, players typically make few errors and achieve great success. For instance, **Postcard Stories** and **Monologue/Dialogue** can both be used in confirmation mode to demonstrate that basic skills have been mastered.

Some relatively complex games may be played twice—first for the purpose of discovery and then, after discussion and learning, to confirm players' new knowledge. However, most of the games described in this volume are elementary and not suited to this double use.

Design Consideration

The power of these exercises can be either increased or diminished by the amount of thought put into the structure of the program design. The key questions are: How do the exercises best support the concepts you are trying to convey? Where do they best fit in? Will it make more sense to explain a concept (such as delays in systems) and then have participants physically experience a set of delays? What exercise will best build on and further the insights gained in the previous exercise? How do they meet the needs of the participants' various learning styles?

By asking these questions, we have found we are more able to create

a seamless experience for participants, where theory and practice reinforce each other.

Creating an Environment for Learning

Creating a safe environment in which participants can explore their own behaviors is critical. The following are not hard and fast rules but rather salient factors we have found help create a safe environment conducive to learning.

Before The Session:

- Consider group size.
  Eight to twelve is an ideal size for all members of the group to be heard, to participate, and to produce useful group dynamics.
- Share the intent of your work at the beginning.
  Share the underpinnings of your design: will you be combining experiential and didactic approaches to reach multiple learning styles?
- Be wary of videotaping.
  At the very least, ask for the group's permission and explain how the tape will be used. Videotaping can cause participants to become very self-conscious, changing their normal behaviors and interfering with their learning.
- Pay attention to the seating arrangement.
  Circles and half moons tend to raise the level of engagement.
- Provide clear, up-front communications about the session.
  What can people expect? Who will be there? Should they wear comfortable clothes and flat shoes?
- Consider the implications of diverse backgrounds.
  You may find that some of the exercises do not translate directly into different cultures. Try to do a test run with someone from the environment in which you will be working.

During the Session:

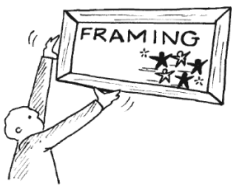
- Encourage "whole speak" (mind, heart and spirit).
  Ask participants to slow down the pace of conversation and to speak authentically, from their heart and their head.
- Use a check-in.
  Give people a chance to introduce themselves (if appropriate) and

become more present by acknowledging "where their heads are" at that moment. A good question to ask: "What do you need to take care of or let go of to be fully present?"

- Provide participation options.
  No one is required to participate or speak in a debriefing session. We like to use the phrase "challenge by choice" to remind people to participate at their own comfort level. Silence or passing should be mentioned as an acceptable option. No one should feel pressed to talk or disclose more than they feel is appropriate.

Degree of Physical Challenge

Unless otherwise noted, these exercises do not require special physical ability. In fact, most require little or no physical strength but rather the spirit of a "beginner's mind" and a willingness to participate. When asking for enthusiastic participation from the group, we remind them of the line on the old Coca-Cola bottles: "no deposit, no return."



Framing Techniques — Ways to introduce Learning Exercises

The way you "frame" an exercise can significantly influence the mindset participants bring to it and the lessons they take away. A "frame," is the story you tell or the metaphor you use to give meaning to an initiative. It includes the precise formulation of the goals, guidelines, and criteria for success. Selecting and presenting an appropriate and compelling frame is an art facilitators develop with practice.

Stephen Bacon, who wrote *The Conscious Use of Metaphor*, asserts: "The artistry lies in delivering the suggestion convincingly enough to ensure that the participants are invested in the challenge."

Your challenge as facilitator is knowing when to describe an exercise as something that corresponds to a specific issue in the home organization of a particular group, and when to go the more imaginary route and talk about "visiting space ships" or "avoiding a swamp of poison peanut butter." Knowing your group will help you decide what kind of frame to use.

There are at least three ways to frame the experiential exercises described in the *Playbook*: isomorphic, universal, and fantastical. Their differences are illustrated here using the **Moon Ball** exercise as an example. Take a moment to familiarize yourself with that exercise before

reading about the following three types of frames.

Isomorphic

This kind of frame replicates the same or similar characteristics of the participants' organization. For example, if the group is comprised of bank managers, you could introduce **Moon Ball** this way: "Your group writes mortgages. In this next exercise, each successful hit of the beach ball is one successfully completed mortgage loan. Every person in the circle is in charge of a different department in the bank, and the mortgage applications must pass through each department. That is, they must be touched by each person. Your goal is to complete as many loans as you can in two minutes."

Universal

This kind of frame references an everyday life situation or event that could apply to anyone in the group, but is not necessarily group or organization-specific. "As team members, you all have a variety of skills and they are all required to solve problems. Your goal is to solve as many problems as you can in two minutes. A problem is 'solved' once each team member has made a contribution."

Fantastical

This kind of frame involves something completely out of the ordinary. You have fun taking the group out of their day-to-day experience. For example, "Your task is to shoot down as many space ships in Darth Vader's fleet as you can in two minutes. The fleet is represented by the beach ball. You shoot down one space ship when you manage to pass the ball (space ship) around the group with each member hitting it once and only once."

Going for the Insights — Debriefing Tips

Debriefing is a process of guided discussion and reflection immediately following a group's exercise experience.There are many processes you and your group can follow to debrief an exercise systemically. We've found the following four-step process to be an effective procedure for debriefing many of the exercises in ***The Systems Thinking Playbook.***

This four-step process serves a three-fold purpose:

- First, it organizes the debrief process into clear and simple steps. For those who are not full-time facilitators, this process can act

as a simple organizing structure that increases one's comfort with the debrief and one's opportunity for a successful debrief.

- Second, this process helps the learner to develop a methodical and thorough approach to using the tools and concepts of systems thinking. Typically, a learner who has experienced several exercises accompanied by the four-step debrief process can recall the four steps without help. Ideally, the learner who approaches the next challenge systemically will remember and use the four-step process.
- Third, the process gives participants an opportunity to become familiar with such systems thinking terms as "behavior over time graphs," "causal loop diagrams," and "systems archetypes"—thus improving their fluency in the language of systems thinking.

Step I: Tell the Story

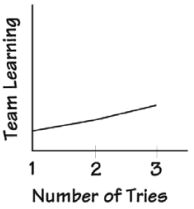
After an exercise, ask the group to "tell the story." What happened? What did they see? What did they feel? What did they experience? Record some of the key points from their comments on a flip chart or overhead. These are many of the variables from which the group will eventually create a "causal loop" diagram. This diagram captures, in the form of a closed loop, the cause and effect linkages between the variables in a system.

After **Moon Ball**, asking the question "What happened?" often elicits such responses as: "We didn't have a plan at first, but we figured it out with a few tries;" "We wanted to get better each time;" "We weren't listening to each other;" "We didn't take into account the differing physical abilities of our members."

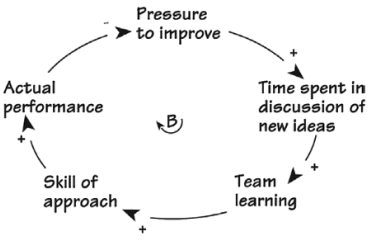
These phrases can then be distilled to their essential meaning or "scrubbed" and turned into variables appropriate for creating the reference mode and the causal loop diagram. In **Moon Ball** some of the important phrases might be:

- skill of approach
- pressure to improve
- team learning
- time to change places

Step 2: Graph the Variables



Depict the behavior of selected variables over time (such as team learning) with a graph (known as a "Behavior Over Time Graph" or "Reference Mode Diagram"). This is an important step toward explaining and understanding the dynamics of the system experienced by a group. Considering the appropriate time horizon, ask the group to identify and draw out the reference mode diagram (in these exercises, time horizon will be represented by number of minutes or number of trials).



Step 3: Make the System Visible — Draw the Causal Loop Diagram

In a causal loop diagram, we connect the cause and effect relationships between the selected variables. A causal loop diagram is essential, as it helps to answer the question: "What structure could be causing the behavior we've depicted in the Reference Mode Diagram?" For a primer on how to draw causal loop diagrams see, "Guidelines for Drawing Causal Loop Diagrams," by Daniel Kim, in *The Systems Thinker*, Volume 3, Number 1. (www.thesystemsthinker.com/tstgdlines.html)

Step 4: Identify the Lessons

What are the insights the group has gained from the exercise? What structures (or in real life, what policies) would the group change to improve results? Where is the area of highest leverage? In the case of **Moon Ball** one structural change could be to substitute "External standards" for "Actual performance" as the most important cause of "Pressure to improve."

Selecting Exercises

We advise using the games in this book as short interventions to jump-start a learning experience or punctuate key insights within a long lecture. Stringing several exercises together will not constitute a coherent experience for participants. Rather, we suggest that you interweave thoughtful lectures, videos, case discussions, and small group conversations together with selected *Playbook* exercises.

In addition to the concepts you wish to explore, your choice of exercise will often be dictated by the conditions of play—number of participants,

length of time available, attributes of the workshop space, availability of special equipment. We provide a summary matrix with descriptions of key attributes of the 30 exercises as well as the disciplines illustrated by each game, based on Peter Senge's *The Fifth Discipline:* team learning, personal mastery, shared vision, mental models and systems thinking. This matrix can be used to match our games to your conditions of play. But you may also select an appropriate initiative by considering the way each exercise illustrates principles of system change.

Donella Meadows has identified various "levers" through which participants in a system can change the behavior of the system. The following is a partial list of her intervention points followed by one or more ***Playbook*** exercises that illustrate that approach.

Change the rules: **Warped Juggle, Five Easy Pieces**

Add reinforcing or balancing processes: **Group Juggle, Living Loops**

Alter information flows; **Monologue/Dialogue, Community Maze**

Select a different time horizon: **Frames**

Change a paradigm or perspective: **Hands Down, Thumb Wrestling**

Enhance capacity for learning: **Moon Ball, Dog Biscuits & See Saws, Touch Base**

Improve team dialogue: **Squaring the Circle**

Alter the length of delays: **Balancing Tubes**

To take an example from the ***Playbook***, **Warped Juggle** provides a valuable practice field for exploring the first lever, changing the rules (or in real life, changing policy or incentives.) By revisiting the assumed "rules" of the game, participants in the exercise find that they can make remarkable improvement, by a factor of ten or more, in achieving their shared goal.

Resources

A thoughtful discussion of different approaches to framing, along with many examples, is provided in *Book of Metaphors, Volume II,* by Michael A. Gass. This book is published by Kendall/Hunt Publishing Co. and distributed by Project Adventure, P.O. Box 100, Hamilton, MA 01936. Fax: (508) 468-7605

For more on systems thinking facilitation, see "Coaching and Facilitating of Systems Thinking" by Rick Karash (*The Systems Thinker* June/July 1996), and "Six Steps to Thinking Systemically" (*The Systems Thinker* March 1995). Both are available from Pegasus Communications Inc. (www.pegasuscom.com/newsletters.html).

Contact

We hope you enjoy this ***Playbook*** and find that it enhances the power of your training and educational programs. We look forward to hearing about your experiences!

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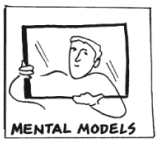
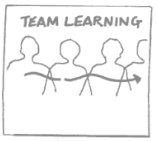
Summary Matrix of Games

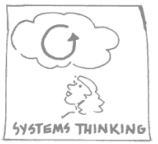
Game	pg	# of people	equipment needed	time (min.)	mental models	team learning	systems thinking	shared vision	personal mastery
1-2-3-Go!	120	3 +	None	5-10	✔	✔			
Arms Crossed	22		None	2	✔				✔
Avalanche	215	teams of 8-15	One long slender pole with two washers per team, tape	10-50	✔	✔	✔		
Balancing Tubes	103		One 3' paper tube or stick per person	5-15			✔		
Belief Release	96		One copy of the script	10-15				✔	✔
Chevreul's Pendulum	34		Large washer, 12" string, and paper target (one set for each participant)	30	✔			✔	✔
Circles in the Air	25		Pen for each participant	2-10	✔		✔		✔
Community Maze	54	max 20	Colored tape. 7'x8' tarp, candy bars	35-45	✔	✔	✔		
Dog Biscuits & See Saws	125	teams of 3	One 12" ruler, manila folder, 4" dog biscuit (or similar item for a fulcrum) per team and 15 miscellaneous small objects per person	45-60		✔	✔		
Five Easy Pieces	50	teams of 5	1 set of precut paper sheets per team	30-60	✔		✔		
Frames	132		(Optional: 8.5"x11" piece of paper per person)	5-30	✔				

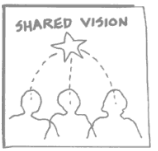
Group Juggle	237	15-20	1 soft, throwable objects per person, bucket	15-60	✔	✔	✔		
Hands Down	68		5-7 items of equal length	5-15	✔		✔		
Harvest	196	4-40	Container, 6 cups, 200 coins, briefing charts on easel	15-30	✔	✔	✔	✔	
Living Loops	179	6-12	One label on a 3' loop per person, ball	20	✔	✔	✔		
Mind Grooving	15		Flip chart or chalk board, pens and paper	5	✔				✔
Monologue / Dialogue	170	4	Two identical line images, flip chart and easel or blank overhead slides and projector	20	✔	✔	✔		
Moon Ball	83	8-30	One large beach ball or balloon	12-20	✔	✔	✔		
Paper Fold	158		Sheet, or one napkin or square of paper towel per person	5-15	✔		✔		
Paper Tear	91	10-50	3 sheets of 8.5"x11" paper per person	5-10	✔		✔		
Postcard Stories	146	Min 3	A set of 2-3 images per person, all different	5-60			✔		
Space for Living	227	Min 10	One rope loop per person between 2' and 6' in diameter	15-30	✔	✔	✔	✔	
Squaring the Circle	114	8-30	A rope 30' or longer	20-30		✔	✔	✔	

Game	pg	# of people	equipment needed	time (min.)	mental models	team learning	systems thinking	shared vision	personal mastery
Teeter Totter	61	2-12	2'10' long 2"x6" boards, cement block, 4 eggs, surveyor's tape, plastic wrap	45	✔	✔	✔		
Thumb Wrestling	30		None	10-20	✔	✔		✔	
Toothpick Teaser	45		6 toothpicks or match sticks per person	7-12	✔				✔
Touch Base	109	20-50	60'-90' of rope in a circle on the ground, frisbee, paper plate, or other 1' target	15-30	✔	✔			
Triangles	205	10-50	Flip chart and easel, one numbered label per participant	20-30	✔	✔	✔		
Warped Juggle	38	6-20	3 tossable objects	20-45	✔	✔	✔		
Web of Life	75	8-12	Ball of yarn or roll of surveyor's tape	10-15	✔		✔		

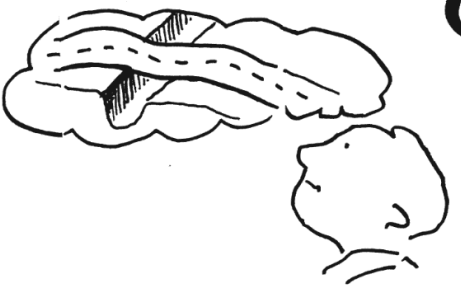








Mind Grooving



"Our life is what our thoughts make it."
Marcus Aurelius, Meditations

John Wood, founder and president of the Center for Developmental Organizations, reminds us that "unless the thinking involved in a system is developed or evolved, the underlying structure, including the brain, remains unchanged." Part of the challenge of thinking systemically is to vigilantly pay attention to our habitual patterns of thinking.

There are three exercises under the title of "**Mind Grooving**." Each provides an opportunity for people to experience, reflect on and explore their own thinking processes. The first in this series of exercises highlights the effect of socialization on our assumption-making process. The second effectively and humorously illustrates our natural tendency to "lump together" seemingly similar concepts and objects. The third playfully shows how a familiar structure or rhythm can lull our minds into mindlessness. These and many other exercises can work wonders as mental massagers, stimulating experiences to help increase awareness of our own thinking processes.

- ⇨ To raise awareness of habitual patterns of thinking
- ⇨ To become aware of how the grooves in our brains impact reflective thinking
- ⇨ To focus on developing the observer in ourselves so we more often have our thoughts as opposed to "being had" by them

- ☆ To better understand our own thinking processes
- ☆ To reflect on how often automatic thought processes can obstruct learning, communication and systems thinking

I like to think of these as "back-pocket" exercises. They can be easily pulled out during a discussion on systems thinking or learning in general to shift a group's attention to its own thinking. I also use them as "ramp-up" exercises to experientially explore the various characteristics of our mental models (automatic, transparent, rapid, etc.) Following a series of these exercises I might launch into a full discussion on the discipline of mental models.

Use these exercises sparingly. Too many in one session can make the facilitator look like the Cheshire Cat with that big, know-it-all grin.

To Run These Exercises

Any number

Approximately 5 minutes per exercise (excluding discussion time)

An overhead or flip charts and marker. Pens or pencils for participants

People will need to be sitting so they are able to see the facilitator and either the flip chart or the overhead projector screen

There is little set-up necessary for these exercises. You may want to arrange for a flip chart or an overhead projector

EXERCISE I: COLOR, FURNITURE, FLOWER

Step 1: Participants write on an index card or piece of paper the first word that comes to their minds when they hear the following words:

color
furniture
flower

Step 2: Ask the group how many said "red" for the color.

How many said "blue"?
For furniture: How many said "chair"? "Couch"?
For flower: How many said "rose"? "Daisy"?

With uncanny consistency the majority of the group will have written down red, chair and rose (or one of the second choices). Ask the group why they think this happens.

Debrief

In the West particularly, we pride ourselves on our uniqueness, creativity and individualism, yet socialization is stronger than we realize. There is a physiological reason for this that has to do with neurological pathways in our brains. They can be called ruts and grooves, but a biologist would call them "neural networks." The more we think in a particular way, the deeper the rut we create. When we unconsciously continue in the same thought patterns, these grooves deepen as we reinforce those patterns. The cycle is a vicious one. The more the grooves deepen, the more

things look to us as if they fit our groove. Considering that there can be an underlying, natural biological explanation that can enhance or hinder our thinking is a very powerful step toward understanding and challenging our habitual patterns of thought.

This exercise helps us to see that those who did not give the typical responses may be the most potent in helping us to look outside our own mental models. Therefore, the secondary point here is that when it comes to surfacing, testing and exploring our mental models of how the world works, we can be each other's greatest assets. Perhaps, we may want to look for those who disconfirm our current mental models as they may be our greatest source of insight and learning.

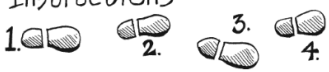
> Can we catch ourselves going "on automatic pilot"?
>
> How can we encourage diverse perspectives in order to surface, test and explore our own mental models?

Inspiration: Daniel Kim, Stephanie Ryan

Exercise II: EVERYTHING BUT "SLEEP"

This exercise reminds us of the brain's ability to make lightening-speed associations, which at times can be based on fast, yet erroneous assumptions. I would recommend using this exercise in conjunction with the Color-Flower-Furniture exercise and other visually or ented exercises as a way to launch into a discussion about the characteristics of our mental models (i.e. quickly forming associations).

Instructions



Step I: On an overhead or flip chart, show the following ten words:

Slumber	Pillow
Dream	Night
Bed	Blanket
Quiet	Pajamas
Nap	Snooze

Step 2: As you will notice, they are all associated with that life necessity, "sleep." Do not, as the facilitator, draw attention to this. Instruct the group to look at the words but not to write anything down for the moment. After ten seconds, turn the overhead off and ask the group to write down as many words as they can remember, without talking.

Step 3: Ask participants to raise their hands if they wrote down the word slumber. Then ask who wrote down the word night. Then, "Okay, who wrote down the word sleep?" Note how many said they saw "sleep." After those people lower their hands, show the slide or flip chart page again. You won't have to say much...those who thought they saw "sleep" will quickly see that it is not part of the list. Groans, laughs and rolled eyes frequently ensue.

Debrief

You might begin by asking "What happened?" The point here is a simple one:

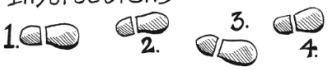
> How do we develop the observer in ourselves so we more often have our thoughts as opposed to being had by them?
>
> How do we, in real time, become aware of the associations we are making, and check for their appropriateness?

Every time I use this exercise with a group, I am amazed that anywhere from 50% to 80% of the people in the room will raise their hands when asked if they saw "sleep" in the list of words. What is even more interesting to me is the language used by participants: "Is that a different list?" Or "There's a trick in this somehow!" Try to pay attention to this language and feed it back to the group. There is a fertile discussion waiting to happen.

Exercise III: OAK, JOKE, CROAK...

This is a good exercise to have in your back pocket. I have found it works best in small groups of 10 or less. Many people will not fall for the "trap" (good for them!) but the majority usually do. As a facilitator, the idea is not to put on that "gotcha" grin, but rather to laugh with the participants. I like to use this as a springboard for discussing mindlessness and the power of mindfulness to enhance the capacity to think systemically.

Instructions



At a fast pace, ask an individual or a small group the following questions (pause briefly to allow a response):

Q: What do we call the tree that grows from acorns?

A: Oak

Q: What do we call a funny story?

A: Joke

Q: What do we call the sound made by a frog?

A: Croak

Q: What do we call the white of an egg?

A: Yolk

Debrief

This and other mental massages (the **Mind Grooving** exercises described in this set) are non-threatening and effective entrees into a discussion of single loop versus double loop learning (see Argyris, "Teaching Smart People How To Learn," *Harvard Business Review*, May-June 1991, p.100). In single loop learning, we cycle back and forth between a problem and a solution. In double loop learning we revisit the mental models we hold about the problem and the possible solutions to that problem. **Mind Grooving** exercises can help remind us to consider our mental models before diving into problem solving.

After running through the exercise, here are a few questions to ask:

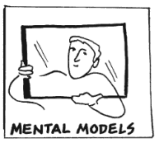
> What are the trip wires we need to lay in our brains so we default more frequently into the reflective mode?
>
> How can we make our conceptual habits less transparent?

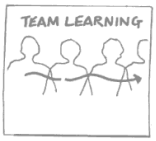
Note: If you will be using this exercise with a non- English speaking group, you will have to adapt it to ensure that you maintain a rhyming structure in the group's native language.

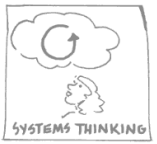
VOICES FROM THE FIELD

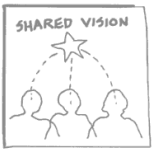
Dennis Meadows recognizes this exercise as a variation on the game, "Simon Says." The facilitator stands in a circle with the group and rapidly issues directions that are reinforced by the facilitator's example. "Touch your hair" (facilitator touches his hair), "touch your ears" (facilitator touches his ears), "clap your hands" (facilitator claps his hands), "touch your nose" — and the facilitator touches his cheek. See how many people catch on. Silly, yes, but effective in stimulating people to higher levels of mindfulness.

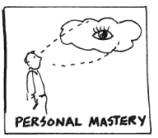
Source: Adapted from Ellen Langer's book *Mindfulness*, originally in G.A. Kimble and L. Perlmutter, "The Problem of Volition," *Psychology Review* 77 (1970): 212-218











Arms Crossed

"The problems we have created in the world today will not be solved by the level of thinking that created them."

Albert Einstein

If Einstein wanted to give people a sense of what it would feel like to change the level of their thinking, he might use this exercise. To build on Einstein's wise warning, we must be willing to continually review and sometimes change our habitual patterns of thought in order to be life-long learners. That is a compelling notion but what we often forget is that the process of changing our personal patterns of thought can be uncomfortable and frustrating. This exercise playfully makes that reality discussible.

⇨ To encourage participants to look at the often uncomfortable and awkward feelings associated with learning as potential opportunities for insight and development

☆ Increased awareness of the self-imposed challenges to changing the way we think

I like to use **Arms Crossed** because it is a wonderful physical analogy to the cognitive process of stepping out of our mental ruts and grooves. This process of recognizing and altering our habitual way of thinking, which often produces our greatest insights and learning, is frequently awkward and uncomfortable. I use **Arms Crossed** to encourage participants to embrace some of the awkwardness as a sign of growth and learning.

To Run This Exercise

You can do this with any number of people: a single person, a group of 10, or a large group of 300

The actual exercise takes no more than a minute. The length of discussion is up to you

Enough to comfortably accommodate participants

None

None

Step 1: Ask the group to do the following: "Fold your arms the way you would if you were bored, with one arm naturally falling on top of the other. Look at your arms and notice which one is on top. Notice how this feels. Is it comfortable? Does it feel normal?"

Step 2: Now ask the group to uncross their arms and fold them again, the other way, with the other arm on top. "How does that feel? What do you notice?"

Here people may comment that the second way of folding arms feels "uncomfortable," "awkward," or "more alive."

Variation

Clasp your hands together, inter-lacing the fingers naturally. Reclasp the fingers, shifting them over by one finger.

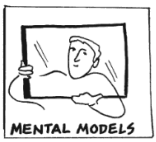
Debrief

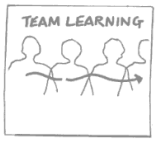
I link the physical analogy of feeling uncomfortable when we cross our arms in a nonhabitual manner to the cognitive and emotional experiences we have when we are learning something new. Dawna Markova has often suggested the key question here is:

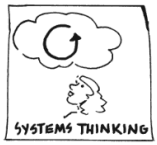
> How does our need to be comfortable and secure and avoid feeling awkward potentially get in the way of our learning?

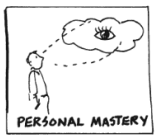
It may be that the times of greatest growth occur when we step out of our "comfort zone."

Inspirations: Moshe Feldenkrais, Fred Kofman, and Dawna Markova (author of *No Enemies Within*)

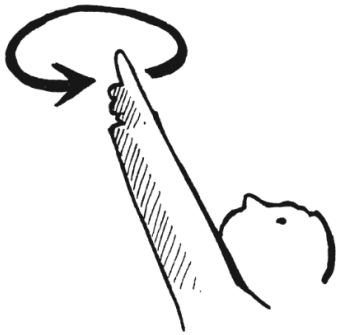








Circles in the Air



How many times have we heard the lament: "If only those guys up there (in the chairman's office) would get their act together!" Or, "If only the management could see how it really is." We all have a propensity to consider ourselves "outside the system," and to blame someone or something else for the problems we are experiencing.

This exercise works on many levels. It exposes our tendency to see ourselves outside the system and the enemy as "out there." It is also a marvelous springboard for exploring the premise that our particular perspective in a system colors our view of that system. Potentially, if we can change our vantage point either mentally or physically, we may discover new insights and new leverage points.

⇨ To explore the possibility that our viewpoint depends upon where we "sit" and to discover new leverage points in complex systems

⇨ To set a context for discussing the concept of underlying "structure"

☆ Greater awareness of "the enemy is out there" syndrome

This one packs a punch for such a simple exercise. Let's say you're hard at work on a large scale change process with a mixed group of healthcare practitioners — doctors, hospital administrators, nurses, etc. You have just begun a discussion on how the structure of a system creates behavior patterns whose symptoms are what we witness as events. You now want to look more deeply into the level of systemic structures and you want to bring a group's attention to the various perspectives they hold.

As people go through the exercise, they quickly discover that they can simultaneously hold completely different perspectives of the same system (i.e. the pen circles clockwise from one perspective and counter-clockwise from another).

This exercise illustrates how our perspectives affect the actions we take within a particular system.

It subtly focuses a group's attention — in a fun, nonthreatening way — on thinking about its own thinking. See the debrief questions for more detail.

To Run This Exercise

Any number

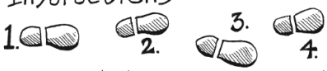
2 to 10 minutes (depending on length of debrief)

Just enough room to be able to point a pen or finger in the air

A pen, pencil or other straight object

No formal set-up necessary. Participants simply need a pen or pencil. They can be either sitting down or standing up

Instructions



Step 1: Ask everyone to pick up a pen (or a pencil).

Step 2: Have them hold the pen straight up in the air, and pretend to draw a circle on the ceiling, in a clockwise direction. Tell them to keep drawing the circle and looking up.

Step 3: Say, "Now slowly continue to draw the circle clockwise, bring the pen down a few inches at a time until it is in front of your face. Continue to circle the pen, and slowly bring it down until you are looking down on top of it. Continue to draw the circle while looking down on it."

Step 4: Ask the group, "What direction is the pen moving?" (It will be a counter-clockwise direction at this point. I smile at those who say "clockwise" and encourage them to try again.)

Note: You will find that some people lose the integrity of the circle as they bring their pens down, swishing their hands back and forth in a straight line. If you notice this, suggest that the person start over and encourage him or her to practice "drawing" a round circle on the ceiling before moving the pen down.

Debrief

The first question to ask is: "So what happened?" The initial responses tend to range from the insightful ("What changed is my perspective") to the self-aware and humorous (see below). After people have had a chance to try it again, most of them will see that what changed as they brought the pen down was not the direction of the pen, but their perspective or vantage point.

The debrief can go in any number of directions. The questions I have found most valuable are:

> What was your initial reaction?
>
> What are the first thoughts that came to mind and the first words that came to your mouth?

Do you remember the language you used to describe what happened?

Do your immediate reactions provide any insight into your own process of forming assumptions?

"We don't talk about what we see; we see what we can talk about." I have heard Fred Kofman, an accounting professor at MIT, say this a number of times and now, after hearing hundreds of reactions to this simple exercise, I know what he means. For example, looking in puzzlement at their pen as it circles counter clockwise, I have heard brilliant people say, "my pen is broken" or "you tricked me."

I often wonder when I hear these comments if we may have stumbled onto a language gap.

Have we yet to find the language for the concept of multiple vantage points in complex systems?

Is it possible that changing our vantage point is a way of discovering new leverage points in complex systems? Ask for examples.

This quote from Donella Meadows (a systems dynamicist, author and columnist) can spark a wonderful conversation:

"How is it that one way of seeing the world becomes so widely shared that institutions, technologies, production systems, buildings, cities become shaped around that way of seeing? How do systems create cultures? How do cultures create systems?" (Donella Meadows, *Thinking in Systems* (2008))

In this exercise, how is it that we may all be looking at a system from a clockwise perspective when we could find ways to look at it from multiple perspectives?

VOICES FROM THE FIELD

The reactions from folks who experience this exercise for the first time are delightful and enlightening at the same time. During a session with a group of 40

practitioners of systems thinking, I heard someone call out: "I think my pen must be broken!"

Other enlightening reactions:

"I never did it right in the first place."

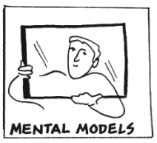
"I changed the direction as I brought the pen down."

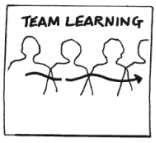
"Let me do it again and do it right."

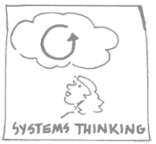
"This is a trick!"

It is interesting to see that in the initial reactions to this exercise there is a tendency to blame someone — usually ourselves — for "not doing it right."

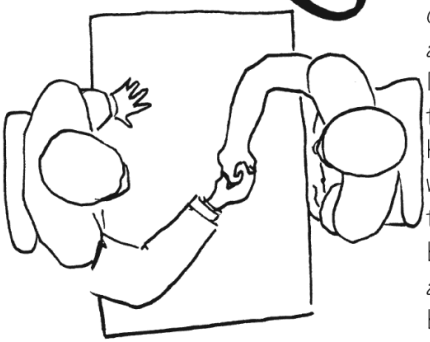
Steve Gildersleeve, a management consultant in Canada, called the other day to tell me of his experiences using this exercise: "I recently was working with a group of 300 people and at the end of the presentation I used the **Circles in the Air** exercise. It was really powerful to see the looks of surprise and astonishment. It really worked to spark a conversation around the whole idea of changing perspectives to get a better understanding of complex systems."







Thumb Wrestling



This exercise uses a well-known children's game (thumb wrestling) to provoke rich discussions about collectively held mental models of competition and collaboration. I sometimes worry that I may be having more fun with this one than the group! I like it because it raises awareness of the barriers and enablers to collaborative competition. From my experience, talking abstractly about the properties of mental models in a lecture format is a losing proposition. Eyes glaze over, arms fold, side conversations spring up. But when you engage a group in an experience like **Thumb Wrestling**, through which they can have fun and be students of their own behavior, then you've created a potentially powerful learning experience.

- ⇨ To show, in real time, how our mental models (e.g., our deeply ingrained beliefs, myths, stories about how the world works) are often transparent and directly affect the actions we take
- ⇨ To practice the art of seeing interdependencies and unintended consequences

- To expose and explore our implicit assumptions about competition and collaboration
- A real-time experience of collectively held mental models (e.g., to have to compete to "win")
- A context for discussing how our mental models or lenses process the information we take in and act on

It is one thing to talk about our mental models and another to see them in action. In the case of this exercise, **Thumb Wrestling** gently and humorously exposes our mental models about wrestling, games in general, and more importantly, winning, losing and the potential for win-win situations. My colleagues and I have used this exercise in several ways: to introduce the concept of mental models; as a wonderfully effective practice field for exploring the characteristics of mental models; and as an experiential introduction to conceptual models of thinking processes, such as the "Ladder of Inference" (developed by Chris Argyris, *Overcoming Organizational Defensive Routines*, p.88-89, Prentice Hall, 1990).

To Run This Exercise

Any even number. If there is an odd number, the leader may want to participate

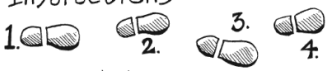
10 to 20 minutes (depending on length of debrief)

None. (Unless you want to give a prize, such as candy, to the winners)

No requirements

Participants sitting in chairs with or without a table

Instructions

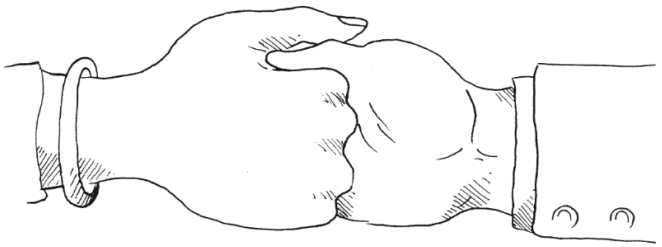


Step 1: Ask participants to find a partner, preferably by turning to the person sitting or standing next to them. If there is an uneven number, the leader may participate.

Step 2: Once everyone is paired, ask the group if they have ever thumb wrestled before. From my experience, more than half have spent long car trips doing this with a sibling in the back seat. Demonstrate for those who don't know what thumb wrestling is. Have the pairs grasp fingers as shown in the following illustration.

Step 3: Explain that the goal is "to collect as many points as you can in one minute." Important: be careful not to set the partners up explicitly as "competitors."

I like to include a first and second prize (i.e. a big and a small bag of M&M candies, especially if I do the exercise in the late afternoon). To get a point, one partner pins the thumb of the other partner (see illustration below).



Step 4: Before beginning, ask each pair to warm up by tapping their thumbs back and forth three times, then when the leader says "go," begin the thumb wrestling.

Step 5: After one minute, stop the game. (There will probably be a lot of laughter and joking, so go with it and have fun.)

Variation

This can also be done as arm wrestling, but beware — it can become quite physical.

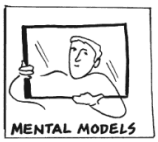
Debrief

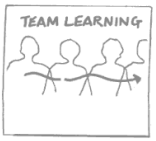
Ask the partners how many points they've gained. You will hear numbers that tend to hover between one and five, with the occasional pair who manages to get 20 or 30. If you have a pair with a high score, ask how they did it. The answer will most likely be that they cooperated, one person allowing his or her thumb to be pinned by the other multiple times, and then switching. Using this method, the partners have a much better chance of "winning."

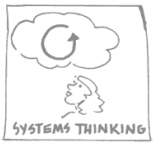
My debrief questions are focused on bringing the group through a "what if" exploration: what if we did the same exercise using the lens of a systems thinker?

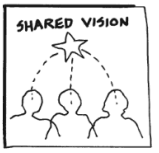
For example as a systems thinker, we might:

> *Consider mental models:* what were our mental models about **Thumb Wrestling**? Typical answers: one person wins and one person loses.
>
> *Look for unintended consequences:* in this instance, straight competition creates an unintended consequence: you both lose.
>
> *Look for interdependencies:* how can we shift our focus to see various forms of interdependence? For example, instead of looking at each other as two adversarial thumb wrestlers, how can we shift our focus to another, higher leverage form of relationship, i.e., collaboration?









Chevreul's Pendulum

Using brightly colored yarn tied to metal washers, an individual or a group can experience the mobilizing power of personal vision and mental models through this exquisitely simple exercise. I especially like to use this in large groups of twenty or more; the more participants, the more powerful the collective "ah ha's."

- ⇨ To experience the power of personal vision
- ⇨ To prepare for work with one or more of the five disciplines, including mental models, personal mastery and shared vision
- ⇨ To experience the philosophy of personal mastery — that it is more important to hold the vision of what you want than to know how you are going to get there

- ☆ An increased awareness of and ability to create robust personal vision
- ☆ A common experience from which a group can talk about the necessary steps toward building a shared vision

Words are sometimes ill-equipped to convey the power, strength and dynamism of a clearly visualized goal or objective. I like **Chevreul's Pendulum** because it allows

participants to rely less on language and more on their ability to create a clear picture in their minds of what they want to create, which is, in this case, movement of the washer in a particular direction. This exercise is a fun way of introducing a key component of personal mastery: the life long practice of visualization.

To Run This Exercise

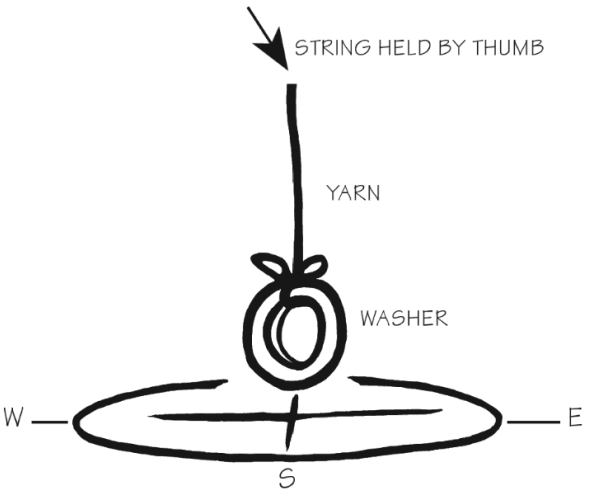
Any number

30 minutes (on average, including debrief)

Participants should be able to prop their elbows up on a table, a desk or a chair. Can be done in circles of 6 or 8, or individually

A metal washer (size of a quarter, one for each participant) tied to a 12 inch brightly colored piece of yarn, paper printed with a "target" (see illustration)

I often prepare the room by placing a set of the necessary equipment on the chair of each participant



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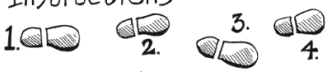


Step 1: Each person is given a metal washer tied with one piece of brightly colored yarn (about 12 inches long). The end of the yarn is placed over the thumb and then the elbow is anchored firmly on a desk or table. If there is no table, people can sit on the floor and anchor an elbow on the chair. (see illustration).

Step 2: The washer is hung from the string over the thumb, approximately 1 inch from the center of the diagram. It should not move.

Step 3: When everyone has the washer at a dead-stop over the center of the diagram, ask the participants to: "Picture the pendulum moving up and down in your mind (swinging from the top of the target to the bottom). Do not guide the movement with your hand. Let the picture you have in your mind do the work. Hold that image in your head." After thirty seconds or so, many people will find that the pendulum begins to swing in the direction visualized.

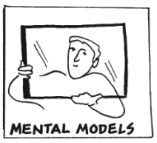
Step 4: Then say: "Use your hand to bring the pendulum to a stop. Now, picture it moving from right to left." Similarly, the pendulum swings from right to left for many.

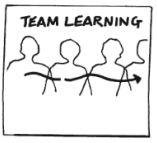
Debrief

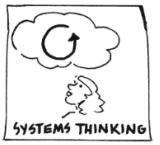
You will, at this point, have a lot of stunned people scratching their heads and looking at you to help them make some kind of sense out of what they just experienced. I begin the discussion by asking how many (by a show of hands) found that the washer moved in the direction they visualized? On average, about three-quarters will have some success. I might then ask the group to consider what force(s) moved the washer? It is through this line of questioning that we can see the

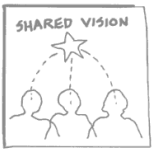
connection between our ability to visualize the results we want and actually achieving those results.

Another good question to ask: "What if you were able to tap into that mobilizing power more effectively and frequently?"

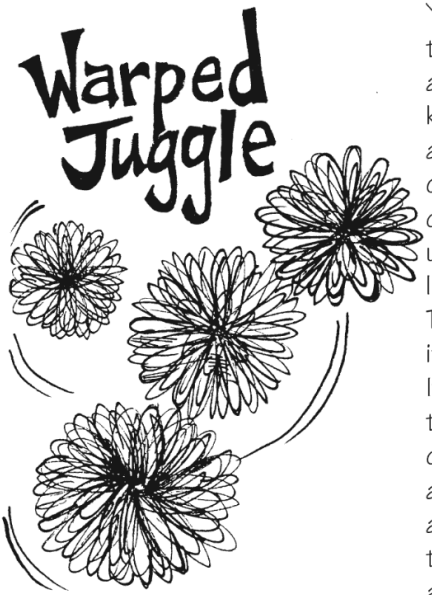








Warped Juggle



You wouldn't think that a group of adults tossing koosh balls, stuffed animals and the occasional rubber chicken would add up to a powerful learning experience. This one does and it is tried and true. It provides a real-time experience of common system archetypes, and an opportunity to explore our automatic and often transparent process of making assumptions. After the group has met the challenge posed by the exercise, they have an opportunity to become students of their own behavior as they retrace their actions through group discussion and, if appropriate, causal loop diagramming.

- ⇨ To work with one or more systems archetypes, including "Limits to Success"
- ⇨ To explore the automatic nature of our assumption-making process
- ⇨ To experience the power of collective mental models

- ☆ Use and examine the creative process for alternate solutions
- ☆ Draw a loop diagram to map the group's process
- ☆ Extrapolate to other situations in which exploring assumptions and looking for alternative models are useful or critical

☆ Surface one or more assumptions about team learning and problem-solving

This exercise is particularly good as an entree to the topic of mental models, as it allows participants to discover from experience their own processes of assumption making.

Traditionally used as a team building exercise, it is also ideal for considering the parallel processes of team problem solving and team learning.

To Run This Exercise

Min: 6, Max: 20, Ideal: 8 to 12

20 to 45 minutes (depending on length of debrief)

Clear away all furniture to create a space large enough for the group to stand shoulder-to-shoulder in a circle. This exercise can be conducted almost anywhere: in a boardroom, on a lawn, in a corridor

Three tossable objects (i.e. tennis balls, koosh balls, oranges, stuffed animals, rubber chicken) Note: tennis balls can be difficult to catch

Have the three tossable objects on hand. If possible show only one object at first, hiding the other two in your pockets

Step 1: Gather the group into a circle, with you as a participating facilitator. Show one of the objects and begin by tossing it to another member of the circle (but *not* to the person standing next to you). It is *important* to use a gentle underhanded toss. This is not an exercise that should require expert catching skills. Slow the pace of the toss if necessary so everyone is comfortable with tossing and catching the objects.

Step 2: The person receiving the object tosses it to someone else who has yet to touch it. When all members of the group have touched the object, it is tossed back to the facilitator. The sequence is repeated with each person remembering to whom he or she tossed the object and from whom it was received. When the group has sequential tossing of one object down, you can then introduce two more objects to the tossing.

Step 3: The facilitator asks the group to estimate how long it will take to toss all three objects in them sequence the group has established. Before coming to a consensus on the time, you should state that there are only two rules:

- 1) everyone must touch the objects once, and
- 2) they must be touched in the same (human) sequence.

When participants ask for clarification on the rules, it is **important** that you state there are only two (as outlined above). When participants begin to ask how they might "bend" the rules, the two rules should be your standard response. Also, I ask if anyone has done this exercise before. If they have, ask them to participate, but not to offer the solution.

Step 4: Come to a consensus on the time and then, with one of the participants acting as a timer (a digital watch is preferred), try the sequence again. When all three objects are returned to the facilitator, he or she calls "stop" and asks the person with the watch what the time was. Whatever time they end up with (typically the first effort is 20 to 40 seconds), you then challenge them to cut that time in half. (To have some fun, I sometimes spur groups on by saying their major competitor has done it in X seconds less). The exercise is complete when the participants feel they have done it in the fastest time possible, usually in a second or two.

Possible Solution

Group members will figure out that they should stand next to the person to whom they are tossing the object. A shuffling then ensues until each is able to pass the object to the person next to them, rather than tossing it across the room.

Variations

If group members are new to each other, ask each person to call out the name of the person to whom they are throwing the object. The person to whom the object is thrown, receives it, saying, "Thank you, Ann," and then tosses it to the next person, saying his or her name.

You may offer a member or members of the group the role of observer. Another way to phrase this is, "We need a TQM person, any volunteers?" Take this person aside and ask him or her to asses the group's process: what happened when someone had a contrary idea? How did the group solve the problem? What patterns of behavior did you observe?

Debrief

What typically happens is that initial efforts lead to improved performance. Over time (usually within the first 5 to 10 minutes), the group cuts the time down from 40 seconds to 10 or 12 seconds but then they encounter a limit. This limit often causes the performance to slow down or even stop, even though efforts to solve the problem may be increasing. An example of "increasing efforts" might be that the group decides to squeeze in tighter together or to throw the ball faster (which actually causes more errors and more delays). At this juncture, the opportunities are rich for gaining insights into individual and group behavior patterns within complex systems.

One way to do this is through the use of causal loop diagramming. Ask the group to identify the key variables in their experience (e.g., teamwork, time pressure,

improvements, etc.) and begin, using a flip chart or overhead, to map the relationships between the variables. Following is a sample diagram.

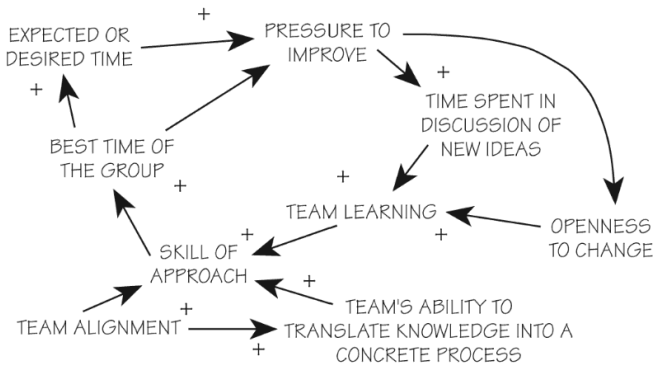
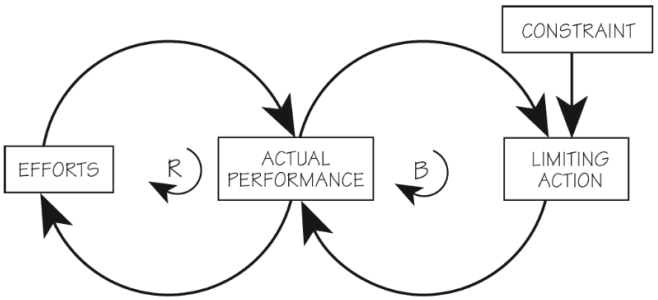


Diagram created by Dennis Meadows

If the group has been exposed to the systems archetypes, ask if they see any such archetype in their own problem-solving process. The "Limits to Success" archetype, for example, typically involves a constraint:



Archetype drawn from *The Fifth Discipline* by Peter Senge
R is a reinforcing loop, B is a balancing loop

Ask what they think the constraints were. In **Warped Juggle**, the constraint is very often the group's assumption that there are more "rules" than those stated by the facilitator. What is the limiting action?

The limiting action here can be that participants hammer away at the same approach, without stopping to reflect on their assumptions, hear other ideas, or consider other options.

Transference to professional and personal experiences: The group experienced how immediate success can produce subtle constraints, particularly in the thinking of individuals and groups. You might ask: "What kinds of inherent pressures and constraints are accumulating in your organization as a result of its success?"

As a facilitator, you can also point out that the way in which we receive information affects the assumptions we make about that information. In this exercise, the facilitator begins by tossing the ball across the circle. Participants assume that they too have to toss the ball, even though there are no requirements in the rules to do so. The fastest times are actually achieved by *not* tossing the objects.

VOICES FROM THE FIELD

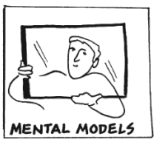
Andy Bryner, a friend and colleague who is a master at creating physical learning practices, used **Warped Juggle** recently with his partner Dawna Markova. They were working with a group of healthcare administrators to "develop an awareness of the whole, and all the variables which influence the whole." Andy and Dawna facilitated eight groups of fifteen people each (a feat in itself!) and had the following experience:

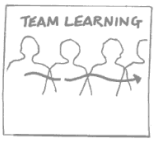
"Even though the two rules were spoken and written, one group continued for most of the allotted time tossing the ball as had been demonstrated in the beginning. They improved greatly over time and had a lot of fun and they never redesigned their structure to meet the constraints in a more efficient way as did other groups. In the debrief, they owned that was true of their unit at work. In service they experienced great team spirit and enjoyment and not a lot of innovation, examining of mental models or rethinking processes.

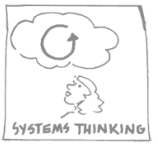
"Another group immediately understood that their structure could be redesigned, tried the first way, and then spent up until the very last minute planning, and managed to accomplish the task in five seconds. But even this great time* brought some discomfort with

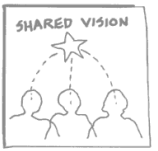
the process: there were only a few vocal planners, lots of ideas were disregarded, and there was not much experiential learning. Many felt out of the creative loop. In the debrief, they talked about how in their unit there were a few super planners and many quiet complaining "compliers" which, over time, produced withholding of resources and dependency on a few. Considering systems thinking, the group talked of an awareness that short term success may actually have the unintended consequence of blocking future learning and greater effectiveness."

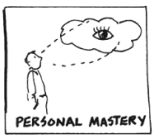
*The best time is often under one second–LBS











Toothpick Teaser

The **Toothpick Teaser** exercise helps us to explore a universal phenomenon: when given data, whether it is a symptom of a problem to be solved or a schedule to be adjusted, the way the data is presented to us affects the possible questions we ask and solutions we see. This is true unless, as Diane Corey reminds us, "we are highly conscious of our own mental models and assumptions." More than a simple "thinking-out-of-the-box" activity, this exercise helps us to collectively reflect on our instinctive approaches to problem definition and problem solving.

⇨ To encourage participants to look at all of the factors influencing their ability to learn and solve problems, especially the means by which a challenge or problem is presented

☆ A mental massage, stretching our brains to think beyond our current mental models

☆ An improved understanding of personal problem solving approaches

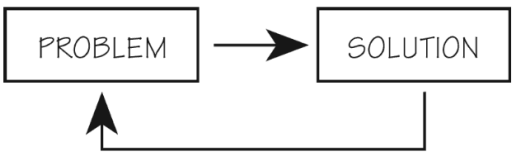
- ☆ An increased awareness of the power of examining the manner in which data is presented prior to problem solving

To some, this will look and feel like a traditional brain teaser, so be ready for a few groans. I usually have a good laugh with the group and note that later we might talk about those groans, which are a good source for mental model exploration.

I often find myself pulling out the box of toothpicks when I want to make the connection between examining mental models and improved problem definition and problem solving. An excerpt of my conversation with a group might sound something like this:

> "It's fair to say that we all solve problems from certain understandings and past experiences. The problems themselves are often not complex and there are many tools out there to help 'problem solve.' The complex issues are our understandings, or our mental models. And what we often forget to do in terms of problem solving is to go back and reflect on our original understandings."

When we cycle back and forth between problem/solution, we are on what Daniel Kim calls "the problem solving treadmill":



In the toothpick exercise, most of us immediately launch into solving the problem (I did the first time), without considering the mental models we have about the problem or the way in which the problem was presented to us. I consider this a mini-practice field in which we can practice the life long art of consistently reflecting on our mental models.

To Run This Exercise

Any number will work. With large groups (15 or more) you may want to have participants work in pairs

Approximately 2 minutes to explain; 5 to 10 minutes to do

Floor or table upon which to place the toothpicks

6 toothpicks or match sticks per person

If you can set up the room in advance, put 6 tooth- picks flat on the table in front of each person

If advance preparation wasn't possible, place a box of toothpicks within reach of each person. Ask participants to each take 6 toothpicks and place them flat on the table. Using all 6 toothpicks, ask them to cre- ate four equal sided triangles.

Possible Solution

One solution requires the person to "think outside the box" and to break out of the one dimensional mode. Lay three toothpicks flat on the table to form one triangle. Use the remaining three toothpicks to create three new triangles by building a teepee-like structure.

Debrief

Participants are, in a way, "set up" because I have them place the toothpicks flat on the table in front of them. The solution requires them to think in 3-D. Part of the obstacle becomes the way the challenge is presented. (**Warped Juggle** requires a similar thinking process.)

Some questions I ask:

> How did I "set you up" when I instructed you to put the tooth picks *flat* on the table?
>
> If you had a partner, in what way did he or she encourage or discourage "out of the box" thinking?

VOICES FROM THE FIELD

Diane Corey, a story teller and organizational learning educator, is masterful in her integration of experiential exercises to illustrate key concepts of Organizational Learning. Here Diane speaks from her many years of experience using this exercise:

"I ask people to work in pairs, and line the toothpicks up like a picket fence on a flat surface (often a notebook lying on their knees). To illustrate, I put the toothpicks flat on an overhead, lined up next to each other. Then I give them the directions and after two to three minutes I'll ask if they're ready for a hint."

At this point Diane explains that the problem is much easier to solve when someone gives you a coaching tip. In the case of the toothpick exercise, her coaching tip is: "You have to solve it two and three dimensionally."

After that, most people groan and solve the problem right away.

In her debrief, Diane asks:

"How did I set you up not to be able to solve this puzzle? How does this relate to your personal and professional lives?"

Through the exercise, Diane helps the participants to consider a universal phenomenon: any time we are being given data, the way the data is presented predetermines the outcomes and possibilities we see, unless we are highly conscious of our own mental models and assumptions.

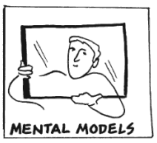
Before the exercise, Diane may use visual brain teasers to bring the group's attention to different visual paradigms (W. E. Hill's old woman/young woman is a

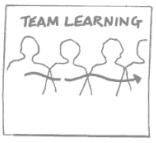
good example). Her question to the group is "How would you coach someone so that they could see the image differently? To coach someone, you have to find the good questions that allow another person's perspective to change." Diane relates this to the skill of balancing advocacy and inquiry. She urges the group to talk about how we can continually help each other shift our focus and consider how that process would look in a meeting.

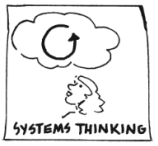
Following the toothpick exercise, Diane often has the group look through newspapers or company documents and highlight mental models.

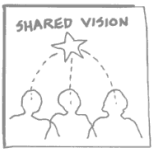
For those who will be trying this exercise with groups, Diane reminds us, "All of these exercises are more powerful if they are part of a flow — a thoughtful integrated structure."

Source: "Problem Solving" 1963 M. Scheerer: *Scientific American* 208: 118-28. With inspiration from Diane Corey.









5 Easy Pieces

(or The Schein Shuffle)

As we see in our everyday lives, the basic pattern of life is a network of interconnected systems. Within a community, for example, there are many sets of interconnected systems: education, business, social service, religious organizations, healthcare, etc. Yet often under the pressure of time and every day life, we act as isolated, disconnected units. The author and physicist Fritzjof Capra reminds us that the first principle of ecology is interdependence. How can we develop the habit of mind to be attuned to this principle in our everyday lives?

This exercise is unpretentious, slightly disarming and ideal for illustrating interdependence, an awareness of which is vital to the development and practice of systems thinking.

⇨ To experience a shift in perception from object (the set of cut-up pieces) to relationships (among the team)

⇨ To explore our knee-jerk tendency to "go it alone"

☆ A greater ability to identify mental models in real time, and see key inter-relationships and systemic structures

This exercise takes some advance planning, so I usually use it when I'm working with a group for a day or more. I like using **Five Easy Pieces** to jump start a conversation about the "Ways of a System Thinker" (see **Guiding Ideas**).

To Run This Exercise

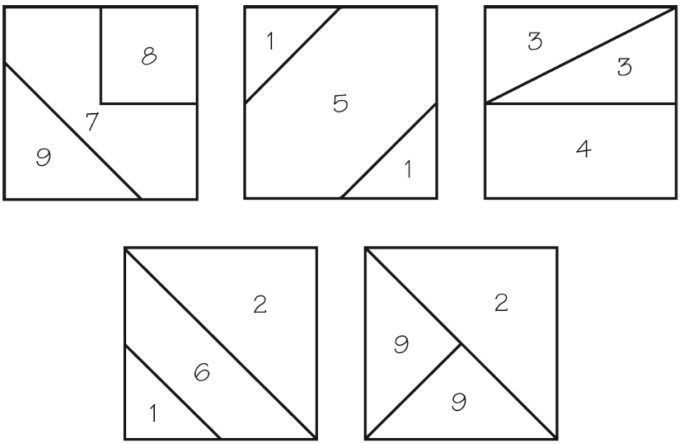
You will need a minimum of 5 people and then any additional multiple of 5

The exercise itself should take no more than 20 minutes. The debrief, when related to similar organizational experiences, can take about a half hour

Enough for 5 people to sit in a circle in chairs at a table, or on the floor without a table

5 pieces of 10 inch x 10 inch colored paper or cardboard; scissors; ruler; a pencil

Prepare the pieces: for each group of 5, cut up five 10 inch x 10 inch pieces of colored paper (card board is preferable, or something that you can laminate). Cut the shapes as described below. The numbers are to guide you in the cutting process (same number, same shape) but the pieces used by the participants should not show a number. Once the shapes are cut, mix them up and divide the pieces into five piles, with three pieces in each.



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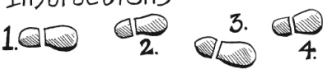

Step 1: Ask participants to gather in groups of 5 (you must have a minimum of 5 in a group) around a circular table or in a circle on the floor. If, for example, you have 50 people you can either divide them into 10 groups of 5, or 5 groups consisting of 5 pairs.