Systems, Sense Making, and Organizational Change
Introduction

If you are reading this, the chance is good that you are interested in leading effective collaboration within organizations. You’ve noticed that collaboration can be difficult, and when things aren’t working it can be difficult for individuals and organizations to change. You may have seen well-intentioned initiatives or projects get off to a good start but then fail to deliver, as colleagues settle back into their usual ways of doing things. You may have seen teams of talented, well-meaning people who aren’t working together as well as you might hope.

Organizations are made up of webs of arrangements and interactions between hundreds of people working together on projects in groups of 2, 5, 7, etc., which form and reform, sometimes on a daily basis. In this complex web, the actions of individuals – which naturally arise from their different points of view – impact the work of others in equally complex, sometimes surprising ways.

The fundamental complexity of dealing with many different points of view in an organization has implications for the success of virtually every task and project. If you are relying on marketing copy from a person that you haven’t spoken to, the perspective of the person who actually relayed the instructions matters a lot, given that you have no direct access to that conversation. What your boss’ boss is thinking about the project is important for the success of your work, but it probably isn’t exactly what your boss is thinking or what others on your team are thinking. To put it simply, many workplace actions and processes are best understood as systems, not as A-to-B transactions.

If you are willing to acknowledge that organizations are systems, and that the important elements within them are people, their behavior, and their points of view, how can this help you? We believe that you can work better within organizations if you understand the basics of classical systems theory and then develop an appreciation for about what is unique about human systems. This leads to a more powerful way to approach making change happen: humans are sense makers, and so to change a human system you need to focus on how people make sense within systems.

The sections that follow walk you through these propositions. First, we look at the properties of systems, using concepts drawn from the discipline known as systems theory. Having this theoretical grounding yields practical implications. It is helpful to know, for example, that systems change more easily if you can find the point of leverage.
Whether you are improving a well-functioning system or attempting to correct a dysfunction, leverage helps you target the intervention that will get the biggest results. Then we narrow the focus to human activity systems specifically, explaining how systems concepts can help you understand how a team of people functions as a system and what that implies for attempts to improve collaboration (or achieve any business goal, really).

In third section, we begin to describe an approach for using systems thinking to make an effective intervention in a team or group dynamic. In essence, this requires mapping the dynamic – seeking clarity on the individual perspectives at play on a particular project or topic. Once you’ve modeled the system, you can really dig in and tease out the implications of the differences in points of view, how they impact each other, and how they contribute to the collective dynamic. With this exploration done, you can find the point of leverage and chart a path towards greater alignment.

One important note: you don’t necessarily need to get everyone involved to improve a human activity system. That’s one nice feature of a system: If the change is aimed at the right spot, people may be influenced to change even if they aren’t fully aware of it. But in some cases, extra effort is required to help individuals reflect on their behavior and their sense making and how they need to change in order to change the system.

Why is alignment worth the extra work? Without alignment, the actions of others often fail to make sense and team members feel frustrated with each other, usually expressed in whispered hallway conversations or the “meeting after the meeting” (when a subset of the working group gathers to say what they really think but didn’t say during the meeting, out of earshot of the others). Quality of work suffers, and progress is slow.

With alignment, a team can make decisions more quickly, make commitments that stick, and move forward with efficiency and clarity of purpose because they have been up on the balcony together: everyone has been heard and understood and the group has reached a shared answer about a given challenge. Being this transparent can take courage, but the results are worth it – both in terms of how effective the work is and how the work feels to those who engage in it.
I. Systems and systems thinking

Systems thinking gives us a powerful way to understand how the world around us works. It can reframe complex and seemingly intractable problems that resist conventional analysis, leading to breakthrough insights, the clarification of old and seemingly insoluble problems and patterns of behavior, and sustained critical, creative, and strategic thinking.

Systems thinking isn’t necessarily technical and mathematical, though it has been highly impactful on engineering and biology. No need to worry: advanced calculus isn’t required. In fact, rather than being an arcane, academic domain limited to specialists, systems thinking is a method or a way of seeing whose universal principles have been used to solve all kinds of problems, from problems of control and communication in cybernetics to shortages in supply chains, and even dysfunctional relationships within families.

As Peter Senge describes it in his influential book, *The Fifth Discipline*, “systems thinking is a conceptual framework, a body of knowledge and tools that has been developed over the past fifty years to make the full patterns of problems clearer, and to help us see how to change them effectively.”

But before we can begin to understand what it means to think in terms of systems, we first have to know what a system is.

**WHAT IS A SYSTEM?**

A system is a set of elements, connected together, that forms a whole, which shows properties that belong to the whole rather than to any of its parts. That is a rather abstract definition, but concrete examples are quite intuitive and easy to find.

Consider for example an ecosystem. The individual parts or elements might be the grass on the African savannah, the antelope that feed on the grass, and larger predators, such as lions, which feed on antelope and who in turn die and decompose, providing nutrients for the grass. Together, the elements form a self-regulating system in which each piece is dependent on the others. Lions prey on antelope, which keeps the herd at levels that won’t exhaust the vegetation that antelope eat. And so while a lion’s presence
is dangerous for an individual antelope, it is good and necessary for the survival of the antelope herd as a whole.

What the systems approach further reveals is that every reaction is always an action. In our example, the antelope aren’t mere prey. They aren’t just acted upon: their presence strongly impacts every other part of the system. A faster, healthier antelope population—thanks to the lions who are good hunters—means that older and sicker lions will have trouble finding prey and will die off, which keeps the pride at numbers that can be sustained by the food supply. That’s good for the lions and good for the antelope too. The grass benefits as well. Bacteria and decaying animal matter leads to healthy vegetation, upon which the entire system depends.

Because of these webs of influence, systems can restore balance if one element undergoes a dramatic change: if the pride is thinned by hunters, for example, the antelope population will increase, but antelopes will die off once the grass is depleted, eventually restoring balance again.

We are all familiar with ecosystems, but there are actually four fundamentally different kinds of systems:

◆ **Natural systems**, which include the ecosystem example we’ve discussed, as well as all biological organisms

◆ **Designed physical systems**, such as heating or cooling systems or car engines.

◆ **Designed abstract systems**, such as mathematical equations.

◆ **Human activity systems**, such as teams engaged on a tasks or organizations like companies or governments.

Human activity systems are different. They are more complex and variable because they include the all-important elements of human intelligence and self-consciousness. But regardless of what system you look at—a thermostat, a computer operating system, a system of logical proofs—a few essential properties apply:

◆ **Interdependency.** The interrelation of parts within a system is more important than the parts themselves. In fact, all the parts of a system must be related (directly or indirectly) like nodes in a web, or else there are really two or more distinct systems.
◆ **Bounded in time and space.** Each system has a boundary and an ideal size. If it expands or contracts without other changes, it will cease to function properly. It’s important to note that the boundary of a system is not always obvious; people using systems thinking to solve problems need to decide together how to define the boundary of the system they are talking about as well as the time frame they will be considering.

◆ **Embeddedness.** A system can be nested inside another system. Systems often form larger super systems and in turn are composed of smaller subsystems. But all parts of a system don’t need to be located together, as long as there is a flow of information or influence across the space between them.

◆ **Openness.** A system receives input from, and sends output into, the wider environment. A system consists of processes that transform inputs into outputs.

As you think about systems and begin to look for them in different places, you may wonder if what you are looking at qualifies as a system. In *The Art of Systems Thinking*, Joseph O’Connor and Ian McDermott offer the table below, which sharpens the distinction between an organized system and something that has a lot of parts but is actually what they call a pile or *heap*:

<table>
<thead>
<tr>
<th>A System</th>
<th>A Heap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interconnecting parts functioning as a whole</td>
<td>A collection of parts</td>
</tr>
<tr>
<td>Changes if you take away pieces or add more pieces. If you cut a system in half, you do not get two smaller systems, you get a damaged system that will probably not function</td>
<td>Essential properties are unchanged whether you add or take away pieces. When you halve a heap, you get two smaller heaps</td>
</tr>
<tr>
<td>The arrangement of the pieces is crucial</td>
<td>The arrangement of the pieces is irrelevant</td>
</tr>
<tr>
<td>The parts are connected and work together</td>
<td>The parts are not connected and can function separately</td>
</tr>
<tr>
<td>Its behavior depends on the total structure. Change the structure and the behavior changes</td>
<td>Its behavior (if any) depends on its size or the number of pieces in the heap</td>
</tr>
</tbody>
</table>

Some things have many elements, but if they don’t have the important qualities listed above they don’t form a system.
SYSTEMS THINKING

Knowing what a system is allows us to think within it, grasp how it is organized, and imagine how it might be altered and improved. But doing so requires that we ourselves learn to think differently.

Thinking in systems means that we learn to think in two ways that are fundamentally new for many of us:

- We must learn to think holistically through synthesis and in terms of processes, as opposed to reductively and in terms of individual events and pieces.

- We must learn to think non-linearly or, to put it another way, in circles.

From a young age, we are taught to analyze the world around us by taking it apart. Hand a child a flashlight and he or she will unscrew the cap, pull out the battery, examine the coil, and look at the bulb in hopes of finding where the light is contained. Analysis of this sort—breaking down wholes into their elements, focusing on the components with greater and greater precision and in isolation—is a valuable skill. But it is not what systems thinking does. In fact, it is quite the opposite of systems thinking.

Rather than engaging in reductionism, system thinking practices the skill of synthesis. Rather than disassembling wholes into parts, it builds wholes out of the relationship between pieces. With systems thinking, you focus on the connections between components, treating them together in order to see how they are related.

Consider, for instance, the different bricks in a LEGO set. You can sort the bricks into piles based on their shapes and colors and bring order to the pile through classification. But the systems thinking approach would stimulate you to investigate the ways that differently sized pieces connect together. Understanding the principles of connection and the variety of connection options allows you to build a great variety of structures. Every child discovers this intuitively.

The systems approach results not only in a bigger picture, but also a deeper understanding. Typically, we see a snapshot in time of an event or problem, but not the processes underlying it. With systems thinking, we can learn to see past the discrete, individual elements (whether they are electrons, antelope, or people) and instead see the structure of relationships that tie them together to create a system.
Thinking holistically, thus, is one key aspect of systems theory. Another is non-linearity. We are steeped in linear thinking. It’s built into the very structure of our language. Even a simple phrase, such as “I drove the car home,” reveals the way we tend to think about activities as a singular subject (noun) whose actions (verb) are unilaterally exercised upon another person or thing (direct object). With linear thinking, we mostly see cause-and-effect relationships that move in one direction.

People who think in systems, however, know that reality is actually made up of circles, not straight lines. They see the lions preying on the antelope, but also see how the antelope—because of their relation to the ecosystem—control the lion population. Thinking in circles gives us a truer understanding of whatever dynamic we are studying. Far from being the endpoint in a chain of reactions, the effect cycles back to the beginning where it becomes a cause.

**EMERGENCE**

By now it should be evident that systems are more than the sum of their parts. Yet what exactly is the “more”? What is the property that mysteriously appears when a system’s components operate together?

The answers vary depending on the system, but the phenomenon itself is known as *emergence*. As Steven Johnson explains, a system begins to show emergence when “a higher-level pattern” arises out of “parallel complex interactions between local agents.” Emergence surfaces only when the entire system is working together. Look for a system’s emergent properties by closely inspecting individual parts of the system and you will search in vain. To see an emergent property you need to run a system and see what it generates.

Emergent properties can be found in many natural and mechanical systems. Weather events such as hurricanes are emergent structures. The development and growth of complex, orderly ice crystals under the right conditions is another example of an emergent process. Even liquid water itself is an emergent property, a product of the interaction between H₂O molecules. As M. Mitchell Waldrop explains in his book *Complexity*: “put a few zillions of those molecules together in a pot. Suddenly you’ve got a substance that shimmers and gurgles and sloshes. Those zillions of molecules have collectively acquired a property, liquidity, that none of them possesses alone.”
Johnson puts it, “agents residing on one scale start producing behavior that lies one scale above them.”

What is important to remember is that emergent properties can be at once surprising and predictable. They are surprising because one cannot always tell ahead of time what exactly will emerge when the elements of a system begin operating in concert. The size, strength, and direction of a hurricane, for instance, at best can be forecasted within a range of possibilities, but never with 100% accuracy. Yet the emergent pattern—the counterclockwise spin of air around an “eye”—is predictable, precisely because it is a response to what the atmospheric system generates. Understand the system and you unlock the key to understanding the pattern of behavior.

**COMPLEXITY**

Emergent properties and patterns are often complex because the system that generates them is itself complex. When it comes to complexity, the first lesson of systems thinking is to mark the distinction between two types of complexity: *detail complexity* and *dynamic complexity*.

Detail complexity refers to systems with a lot of different parts that fit together in only one way. A 1,000-piece jigsaw puzzle, the elaborate façade of a cathedral, or the parts of an IKEA desk that you assemble are examples. Because the parts of the system have a set arrangement, the way the parts influence each other is largely set too.

Dynamic complexity, in contrast, refers to systems in which the parts fit together in multiple and often changeable ways. Thus the parts “dynamically” influence each other. The hurricane we discussed earlier is a good example of a natural system that is dynamically complex. The complexity isn’t just of the parts – how many and how many different types – the main source of complexity comes from how the parts influence each other. Humidity levels, air temperature, wind speed, wind direction, high and low pressure zones – each of these affects the others (or not) in different ways depending on how conditions develop. There are a lot of variables, and the variables influence each other in a lot of ways.

A system can have both kinds of complexity to different degrees. A car engine is an incredibly complex system (with multiple complex subsystems) but it is characterized by *high* detail complexity and *low* dynamic complexity because the thousands of parts in an engine fit in only one place and can influence only a predetermined number of other
parts in the system.

The human brain is the most complex thing we know of in the universe, and so it’s not surprising that it shows extremely high levels of both kinds of complexity. The brain has tremendous detail complexity, with billions of neurons. And it has supreme levels of dynamic complexity in that the neurons form and reform their connections with each other virtually every second.

If a system has only a few parts, it often appears to be less complex than a system with many parts. But this isn’t necessarily true at all. If a system has a high level of dynamic complexity it can be much harder to deal with and predict, even if the number of parts is low. Examples abound in human systems. In a family of just a dozen people, a man could be a son, a brother, an uncle, a father, and a husband. Every other person in the family has multiple roles too, each requiring a different relationship to the others in the system. Family dynamics are highly complex, as we all know (more about this later).

Making a distinction between complexity of detail and dynamic complexity is important because systems should be approached differently depending on what kind of complexity they display. Unfortunately, as Senge points out, most problem solving approaches are far better suited to situations where there is detail complexity and offer little insight into dynamically complex problems.

How does systems thinking help us better understand and manage all systems and all kinds of complexity? In a few important ways:

- While systems thinking does not eliminate complexity, it sees through it to the underlying patterns, allowing for a more finely tuned assessment of a problem or situation.

- Employing systems thinking, one recognizes that when working within a system, one can never do just one thing. Change one variable in the system and you change at least two more with it, changing at least four more in turn.

- Recognizing that no action is isolated and that each exists in an intricate web is a powerful insight and an important step in learning to manage all complexity.
FEEDBACK

At this point it is clear that systems work on the basis of how the parts influence each other. Let’s look more closely at how this influence plays out. The word we use to describe flows of influence in a system is feedback. There are two types of feedback: reinforcing and balancing.

Reinforcing feedback drives a system in the direction it is already going. A snowball rolling downhill is often used as an icon to stand in for this kind of system: a small chunk of snow falls off a tree and starts rolling downhill. As it rolls, more snow sticks to it. It gets bigger. As it continues to roll, it gets bigger still.

Compounding interest is often cited as an example of a reinforcing feedback. The amount of money in your savings account earns interest. Once the interest amount is added to the balance, the balance is larger. This means that the amount of interest you earn in the next cycle will be slightly larger. The cycle repeats and your account grows in value. Because each element is both a cause and an effect, the feedback is a loop and is best represented by a circle:

![Feedback Loop Diagram](image)

Reinforcing feedback functions the same way for outcomes that we would consider much less desirable, like increasing credit card debt or the spread of cancer cells in a living organism. Reinforcing feedback loops typically lead to growth or decline; they create virtuous and vicious circles that can eventually spin the system out of control.

In contrast, balancing feedback bring a system back to the status quo by limiting or opposing change. The thermostat for your heater at home is a classic example:
When your thermostat is set to 72° and the temperature rises above that level, the thermostat will shut off the heat. Temperatures dipping below 72° cause it to turn on the heat. How warm the room is will obviously oscillate, but will always tend back to the set point. Clearly, systems characterized by balancing feedback loops need to have some way to measure a change in state in order for that change to result in a particular reaction. Again, as a principle, it doesn’t matter to the balancing loop if the change is desirable or not. Balancing feedback keeps a system stable.

A couple things to remember about feedback:

- **Time delays.** Expect a time delay between cause and effect in systems. The feedback loop can take time to complete. The more complex the system the more time it may take for the feedback to appear. Time delays, if not taken into account, can result in overshoot and oscillation (think about adjusting the water temperature in the shower)

- **Unpredictability.** Actions create effects – or feedback – in parts of the system sometimes quite distant from their source. For this reason, the results of any intervention in a complex system may well be unpredictable, including effects we did not expect in parts of the system we were not aware of influencing.

**LEVERAGE**

Leverage is one of the most important concepts in systems thinking, because it is through the exercise of leverage that systems can be shifted in one direction or another, and perhaps be permanently altered. As Senge explains, “The bottom line of systems
thinking is leverage – seeing where actions and changes in structures can lead to significant, enduring improvements.”

Exerting leverage shouldn’t be a Herculean task. In fact, leverage is most powerful when it follows the principle of the economy of means. Using a lever—the root of leverage—one is able to multiply one’s strength to accomplish a job, such as lifting a pallet of bricks, which would otherwise be impossible. The takeaway? The best results follow not from large-scale efforts, but from well-focused actions.

So where should you focus if you want to change a system? It helps to know whether the system is dominated by a reinforcing loop or a balancing loop.

For a reinforcing loop, one effective approach is to influence the loop so that it runs in reverse. Take this example:
Where could you influence this loop? The use of air conditioners is the place where an individual can have influence. If you reduce the use of air conditioners, you in effect play the loop in reverse:

For a system that is in balance and doesn’t want to get out of balance, finding leverage works a bit differently. The trick is identifying and changing the real limiting factor. The limiting factor is always in the balancing loop, because as we know, balancing loops resist change. They are what keep a system stable, even if that stability is dangerous for the system in the long run.

As we think about the principle of leverage, we should keep in mind O’Connor and McDermott’s observation that “systems can suddenly collapse when you put them under enough pressure for long enough. They can also suddenly change if you find just the right combination of actions.” “When order is reestablished,” Alexander Laszlo adds, “the chaos of transformation gives way to a new era of comparative stability.”

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1 This example deliberately ignores the important fact that people don’t want to use their air conditioners less in the summer. The next sections of this document will address the crucial importance of human thinking when it comes to changing systems. (Also, air conditioners aren’t the only source of pollution.)
2. Human activity systems

Over the last 50 years, systems theory has influenced many fields. But its effect on the understanding of human activity systems – families, work teams, and larger organizations like education systems and corporations – has been especially noteworthy.

Human activity systems are different enough from other types of systems that we have waited until this section to really focus on them. That said, the main insights systems theorists apply to both engineered and natural systems are absolutely relevant to human systems. It is worth calling out some of the ways that human activity systems display general systems properties. Simply pointing out these basic properties can feel counter intuitive, and pondering them can lead to new ways of thinking about human organizations and group dynamics.

So, let’s begin by exploring a few observations:

- Human systems, like all complex systems, are comprised of individual actors who are mutually interdependent
- Feedback loops in human systems produce emergence, the source of both productive work and dysfunction
- Balancing feedback loops in human systems foster stability, for better or for worse.

**INTERDEPENDENCY**

In an atom (the tiniest system), each particle—electrons, protons, and neutrons—affects every other one. This principle applies in larger human systems, like supply chains for example, where producers, wholesalers, and retailers depend upon and impact everyone else with each decision they make.

Any complex organization, business, or institution forms and is formed by a web of interconnections. The old hierarchical model in which one department or level of management gives orders to another and that one gives orders to a third does not capture the internal complexity of businesses today (if it ever did!). Because all the parts are interlinked, a change in one part of the system — in marketing, for example – will create ripple effects elsewhere – in production perhaps. These effects can occur out of sight and without the knowledge of those responsible for them. Top-down, linear
thinking is insufficient to appreciate how organizations and teams function as complex webs of changing influence.

The focus upon the entirety of the system may seem like common sense, but it actually goes against the grain of some of our most deeply held ways of understanding the world. At all levels of our formal education and on-the-job learning, we have been taught to prize individualism, competition, and specialized training. Indeed, this focus upon the individual part is valuable. It’s one of the cornerstones of Western culture. But it is not the whole story.

As Alexander Laszlo argues, “the general systems approach encourages the development of a global, more unitary consciousness, team work, collaboration, learning for life, and exposure to the universal storehouse of accumulated knowledge and wisdom.” The key point to take away from Laszlo isn’t the empty cliché that “we are all in this together,” a sentiment many share but don’t practice. Rather, it is the more difficult truth that the interdependent structure of the system profoundly shapes individual behavior, and thus fundamentally changes our understanding of responsibility. The system distributes responsibility for results among all the parties.

As Peter Senge puts it, “the systems perspective tells us that we must look beyond individual mistakes or bad luck to understand important problems. We must look beyond personalities and events. We must look into the underlying structures which shape individual actions and create the conditions where types of events become likely.”

**THE PARADOX OF EMERGENCE**

Human activity systems are characterized by the same dynamics as non-human systems, though the results can be a bit paradoxical. Let’s go through the basics of system dynamics to see what this means exactly.

The more individuals on a team, in an organization, or in a business system (like a supply chain), the more detail complexity it has. These kinds of systems can also dynamically complex because its members typically relate to each other in various combinations and in varied manners depending on past experiences, levels of self interest, new expectations, alliances with other players in the system, and any number of factors. Dynamic complexity in a human activity increases exponentially as members are added. With 2 players there are 2 possible paths of influence, but with 3 players, the number leaps to 6, and so on. Feedback travels around on these paths of influence.
Ultimately, groups of human beings interacting with one another in a system collectively create something: a level of performance, a work product, a team culture, a marketplace, etc. This emergent quality comes from the group as a whole and isn’t a property of any one person.

Peter Senge and his colleagues at MIT have designed a game – a simulation actually – that helps demonstrate the functioning of a human activity system. They ask players to take the role of stakeholders in a simple supply chain: a beer manufacturer, a beer wholesaler, and a corner store owner. In a series of rounds, each player is asked to make a decision (how much beer to make or order) on the basis of what the others did in the previous round. The simulation begins with the store owner seeing a spike in purchases of a regional beer. In the vast majority of cases, the person playing the store owner increases his usual order, and continues to increase it when, week after week, he isn’t able to get the number of cases he has ordered (the brewery takes longer to notice the spike in demand and needs to ramp up capacity to make more). And in most cases, the wholesaler does the same, increasing orders week after week. The game typically ends with massive overproduction. In the debrief, all the players usually blame each other for the excess inventory.

This rather simple game demonstrates that in a human activity system, individuals influence each other and make decisions from their own point of view. Each player acts in good faith, but the time delay in seeing the consequences of decisions means that people repeat mistakes without knowing that what they are doing, making the situation worse. Each person responds to the decisions of the other, compounding the problem. Paradoxically, the collective result for all the actors in this system is negative, though nobody had any conscious negative intent – everyone behaves they way they think they should behave. The reinforcing feedback loop results in a classic bubble: the system takes on runaway momentum from the collective actions of the people within it.

THE STRONG ATTRACTION OF STABILITY

While we all know bubbles can happen, human systems ultimately tend towards homeostasis or stability. Typically we value stability, but keep in mind that in systems thinking, it is neither good nor bad. Stability is simply a marker of the status quo, the state that a system has settled into over time. When the system is disrupted and a gap opens between the balancing point of the system and where it has been pushed to (by some pressure pushing it in one direction or another), the system as a whole will
eventually return to where the relationship between internal elements is most stable. The bubble will pop.

Reflecting upon this property, O’Connor and McDermott remark that systems “act like strong elastic nets: when you pull one piece out of position it will stay there only for as long as you actually exert force upon it.” Left to itself, balancing feedback loops will return the system to its prior state. Every political reformer and new business manager knows this to be true, which is why real change is likely to be met with passive or active pushback.

Consider the example of a sales organization that launches a new portal for sales reps to submit orders online – from the road on their laptops. With online orders coming in from the field in a timely fashion, the thinking goes, fulfillment can happen faster and customers will have a better experience. Real time ordering will also space out orders and prevent order backlog. But month after month sales reps in the field aren’t using the system as much as was expected. They do use it, but they are also bringing in big piles of paper orders, just like they did before the new system was put in.

Finally, a sales support executive starts to get curious and asks some questions. As he explores, he learns something interesting: because sales people need to make quota on a monthly basis to get the maximum commission, they often hold a pile of paper orders in reserve that they can hand in right before the end of month deadline if they need a bump to get to quota. If they do make quota, they submit the paper orders at the start of the next month to get a jump on their numbers.

In this case, the new online portal was an attempt to establish a reinforcing loop – more timely orders means less backlog means faster delivery to customers means happy customers means more orders. But there is a balancing loop fighting against this one, since the way compensation is designed for the sales force is part of the system in a holistic sense. Even if nobody on the sales force consciously wanted the new ordering system to fail, it was still going to be unsuccessful because the sales reps are under the influence of the compensation system, which hasn’t been changed. The compensation system acts as a balancing feedback loop that brings the ordering system back to the status quo.

So how would you actually change the way the sales force places customer orders? You could put all kinds of extra energy and force into inspiring the change: upgrade the online portal to make it easier to use, give all the sales people wireless cards for their
laptops so they can always get an internet connection, offer a training session on how to use the portal, make T-shirts promoting the portal, etc. But none of these solutions make use of the concept of leverage. In this example, the point of leverage in the system is where the ordering system (the reinforcing loop) intersects with the compensation system (which in this case is acting as the balancing loop). Make thoughtful adjustments to the compensation system, and the sales reps just might change their behavior without any of the other interventions.

A few things to note about leverage in human activity systems:

◆ As we discussed in the last section, leverage follows the principle of the economy of means: the best results usually follow not from large broadcast efforts but from well-focused targeted actions.

◆ Skilled leaders know not to push back against resistance in the same direction and with the same force. In other words, “they don’t give as good as they get.” Instead, they look for the underlying source of resistance, since tactically exerting pressure there can fundamentally alter the patterns that hold things back.

◆ As a general rule, leverage upon places in the system that are more tied into the network (i.e., affect more people) will create more pervasive change.

Leverage can work, but it is important to admit that the example above takes a somewhat optimistic view. The sales reps are assumed to be working in their best interests, so if you change the system to align the behavior you want with the behavior that is rewarded, they will change. But psychologists tell us that people routinely resist change and prefer stability, even when it comes at a cost.

Take the example of a Fortune 100 electronics company where there has been infighting and mutual suspicion between the marketing team and the product development team for months or even years, despite the fact that individually everyone wants to get along and do a good job. The relationship between any two individuals might be perfectly fine, but taken collectively there is tension and discord. In this case, what emerges from this human activity system is work product (ideas, products, campaigns) and a kind of generalized dysfunction.

The situation is both dysfunctional and stable. Within the group’s internal operations, disagreement and distrust creates a dynamic that each member understands and is at some deeper level comfortable with. The phrase, “better the devil you know than the
devil you don’t” expresses the sentiment. In the field of family systems theory, to use another example, this reality is all too common. Working with families in crisis, therapists (and even individual family members) recognize that no one wishes to have an alcoholic father, but deep down each can recognize that his problem holds the family together by giving individual members a familiar role to play: the loving but exasperated wife, the dutiful daughter, the rebellious son.

In both cases, the principle of self-regulation is in effect, where there is resistance to any new variable that might disrupt the equilibrium. That’s why the introduction of a new person into the team—or a consultant from outside—who is unfamiliar with the hidden alliances governing it, is often met with suspicion. It’s feared that he or she might disrupt the delicate ecosystem of the team, like invasive species (zebra mollusks, beavers, or kudzu) have in natural systems. Such invaders are often repelled, even in human systems that are aware that they are at an impasse.

For our work team, disagreement and distrust are what we call strong attractors, which are clearly, if unconsciously, overriding other attractors in the sub- and super system, such as collegiality, a sense of team work ethic and productivity, the goal of increasing market share, or whatever it might be. In the family example, the strong attractor might be a fragile, eggshell-sense of calm that prevents direct confrontation by the family with the source of its problem.
3. Human systems and sense making

Now that we are equipped with the basic concepts of all systems and seen a few human systems at work, we are ready to explore what is uniquely human about human systems, what is at play in them, and what our subjective experiences do to the systems themselves.

The fundamental distinction that sets human systems apart from engineered, natural, and mathematical systems is that they have people in them. That may seem obvious enough, but this fact alone changes many things about how human systems function.

Unlike the behavior of an electron in a subatomic system or a lion in an ecosystem, human behavior is not governed by unchangeable laws (like the laws of physics or instinctual behavior) that lead to predictable actions and outcomes. As M. Mitchell Waldrop puts it, the agents in a non-human system are *dumb*. “In physics, an elementary particle has no past, no experience, no goals, no hopes or fears about the future. It just *is.*” People, in contrast are *smart* agents in a system: thinking, making choices, forming expectations, and acting on the basis of strategies.

If we are going to understand the world of human systems and the emergent qualities they create, we have to begin by understanding how people tick: how they think and how the way they think influences the way they behave.

**HUMANS ARE SENSE MAKERS**

First and foremost, people are sense makers. All of us, every day, walk around putting together an understanding of the world around us. We all strive to make sense of situations; it’s not something we can turn off. And since we live in a world of social bonds and obligations, we make sense of a world that is full of other people. So it follows that we do a lot of our significant sense making focused on the interactions we have with others.

Barry Jentz, in *Talk Sense*, offers an intentionally simplified and useful way to conceptualize sense making in interpersonal dynamics. Every interaction — a

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2 Barry Jentz and colleague Joan Wofford have video recorded thousands of people involved in difficult conversations, forming the fact base for the conclusions they put forward in *Talk Sense.*
conversation, a negotiation, a meeting – is an event. How we behave during an event depends on the sense we make of the relevant data available to us. Data includes the things that happen in that particular event (e.g., the words the other person says) and the facts, memories, and impressions that we have stored away from previous experiences. As we interact with others – getting feedback from a superior or hearing an explanation from an HR manager, for example – we process these events, filling in for ourselves the intentions, meanings, and implications of the data. And, having made sense of the event for ourselves, we respond. Our responses then introduce data back into the interaction that the other individual will make sense of in turn. Jentz maps out an interaction by drawing what he calls the event cartoon:

One might assume that two people involved in an event could make sense of it in exactly the same way, but this is rarely the case. One important reason is that we rarely have exactly the same set of relevant data – captured here by the not completely overlapping circles representing each person’s data. In addition, the ways we make sense reflect our different personalities, life experiences, and frames of reference. Sense making is contingent and personal, and reflects a point of view – ours – that is by definition different from anyone else’s.
THE DYNAMICS OF SENSE MAKING

While the sense we make of an event may be personal and unique, the dynamics of sense making generally follow the same pattern for all of us. Sense making drives our behavior, since we decide how to act on the basis of the sense that we make of the data that we hold. And our sense making is informed by, and takes shape in response to, our mindset.

What’s a mindset? A mindset is a fundamental operating assumption. We all process information, assess people, and make decisions on the basis of deeply held beliefs and pre-baked ways of thinking – without being consciously aware of it in most cases. Since mindsets are intangible and not fully conscious, we often need to work pretty hard to discover, through self-study, what mindsets we may be holding about a subject and how those mindsets affect our sense making.

While different disciplines and theorists define the term mindset in different ways, for our purposes today we are narrowing the discussion to the argument Jentz advances in Talk Sense. After spending his career studying patterns in conversations between people where there is something at stake, Jentz has extrapolated a generalized mindset that he believes drives behavior. When under stress or when feeling challenged, he argues that we all operate on the basis of a fundamental mindset, best expressed this way: people are problems to be fixed, unilaterally, by me.

To illustrate, recall the dysfunctional Fortune 100 electronics company where the product development team isn’t on the same page with the marketing team. Looking more closely, one crucial issue is that the head of product development is typically evasive in responding to the head of the marketing’s requests to make changes to technical specs before new promotional campaigns. The sense made by the head of product development sounds like this: “I’m protecting my colleagues, giving them the space to do their work without interruption. Product development is real science, and my team should be left alone – I’ve seen this sort of meddling from marketing go badly the past.” He unilaterally solves the problem with marketing by putting off the head of marketing’s requests. It doesn’t occur to him to share his sense making. He operates from a just-fix-it mindset that leads him to act unilaterally: he keeps a closed agenda (not saying what he really believes) and withholds data (not sharing why he believes it).

Of course, the foot-dragging by product development looks like obstinacy from the marketing perspective. The head of marketing head sees the inaction of his colleague
and attempts to make sense of this data, thinking something like, “What’s wrong with this guy? He must be trying to control the situation because he doesn’t want to get out of his comfort zone. I’m going to need to go around him to save this project.” And so he unilaterally formulates his own plan to fix the problem that the product development head represents for him, based on his own sense making. And he too fails to share his sense making or data with the person he intends to fix.

The fact that both the head of marking and the head of product development really believe they are acting in good faith to make the project successful is crucial to recognize. When we act from a reflexive, unilateral mindset we usually construct a *story or narrative* about the situation in which our own efforts to fix the problem are heroic. And since we are typically the hero of the stories we tell about our motives and behavior, these narratives make our highly visible actions feel justified. Unfortunately, other people, when looking at our visible actions, rarely construct quite the same story.

Even when have the best of intentions to do something productive – solve a problem, get work done, make a project successful – our unilateral just-fix-it behavior often undermines our intent. When we make sense of a situation unilaterally we don’t acknowledge the other person as a sense maker in his or her own right. As a result, we solve our *idea* of the problem, and our actions usually feed back into the larger system with compounding results.

**A SYSTEM OF SENSE MAKERS**

System thinking helps us see that our sense making is itself a dynamic system embedded within a larger human activity system (a team, office, or organization). Systems thinking also helps us see that our sense making, and the actions we take, always exist within a series of feedback loops with others who are making sense of each other – including us. Once we grasp the fundamental fact that we are *in* a system, as opposed to observing it from outside, the way a physicist observes an electron’s behavior, we can recognize that *our* sense making is a variable in the system that adds to its complexity and unpredictability by interacting with the sense making of others.

Let’s go back to the example of the sales reps who were asked to use a new portal to place customer orders, so we can take a look at the sense making in that situation. The sales reps each reason through the new ordering protocol: what it implies, what they think is intended, what they feel its value is. The sense they make will certainly be
somewhat different. Some may have an emotionally charged oppositional reaction: “Those damn bureaucrats. Always trying to make things complicated. I’m not changing.” Others may be less immediately resistant, thinking, “Some of the tools they give us are helpful. I’ll give this one a chance,” only to find themselves hesitating a few weeks later. These sales reps may not be fully conscious of why they haven’t complied, and some may still think that they will start using the portal, maybe next month. And other reps may be coolly analytical about their choice from the start: “I need to control the timing of orders to make quota each month, so I’m going to ignore this new protocol.”

Of course, the sense they make is dynamically influenced. The conversations and exchanges they have with each other are feedback and shape their sense making: “Bob says he isn’t using it! So I don’t see why I should.” “I was on the fence about it, but Joe pointed out that we lose a lot of control if we use it, so I might wait and see.”

In this example, once the sales support executive figures out that the quota policy is motivating resistance to the new ordering portal, he is in a position to make effective changes. One reason changing the quota approach might work, we now realize, is because it changes sense making about the benefits of using the portal. The executive sees what is influencing the sense making, structurally, and changes the structure to influence the sense making – therefore inspiring people to behave differently. This approach to change treats the sense making somewhat mechanistically. But when a few people behave differently, it inspires more people to change, and eventually the team may see a satisfactory level of compliance with the new protocol.

You can sometimes make change this way: finding the system influencing the sense making – the point of leverage – and adjusting that system. You don’t necessarily need people to examine their own sense making explicitly. You can operate at arms length from the sense making, influencing it indirectly.

**GETTING UP ON THE BALCONY**

If your goal is to increase compliance with a new policy, applying the principle of leverage mechanistically may be all you need. But in many cases, you will need to get openly involved in the sense making within a system in order to change it.

Why might this be necessary? Usually when your goal isn’t compliance, and the people are mostly making sense of each other, not something tangible and externally identified like a new policy. Think about the product head and the marketing head. They are
making sense of each other. It’s hard to imagine a mechanistic leverage point that would externally influence their sense making about each other. The dynamic between the sense these two people have made is the crux of the system. In this case you need to get directly involved in the sense making.

The best approach to helping people understand their sense making is to have what we call a balcony conversation. The phrase builds on Ronald Heifetz’s work on leadership, where he recommends that leaders faced with a problem get up on the balcony above it to gain some distance and see it from a fresh perspective. The phrase metaphorically evokes the image of climbing up to a balcony above the dancers in a ballroom – you get a broader perspective than you could when you were a dancer on the floor. We use the term balcony conversation to mean that you bring someone else up on the balcony with you, so that you can establish a shared perspective on a situation that involves you both.

Let’s start by seeing what it looks like when two people get up on the balcony with their sense making. Imagine the two managers in the previous example sit down to discuss their differences. Instead of offering up a description of the behavior he objects to and the desired behavior that would be the solution, the head of marking slows down and listens. Seeking understanding, he asks questions to pull out a picture of his colleague’s thinking, the data he bases it on, and the narrative he feels explains his actions.

Doing so requires that he remain attentive, asking: “What do I hear in his tone? Do I hear an implicit hope, intent, fear, plea, need, or assumption? Do I hear reasons or reasoning? Or do I hear the sound of someone who is confused and searching, trying to put the pieces together?” It also means that the head of marketing shares with his colleague what he has heard, to confirm that he has got it right. And when he doesn’t understand, he has to share that too, and ask for guidance, until his colleague feels understood. At this point the head of marketing shares his data and sense making, and works to help his colleague understand it.

Now the two managers are up on the balcony together. They’ve reached an elevated position above both of their ways of seeing. Getting up on the balcony requires some effort. It requires that both parties listen reflectively. It requires that they share their sense making and invite the other to reciprocate. The goal is to create a collaborative context for both parties. Keep in mind that the balcony is where we invite the other person to work with us in order to move forward.
Jentz would say these two people are no longer acting on the basis of a unilateral, reflexive mindset. He argues that if we can slow down and have a balcony conversation, we are operating from a **collaborative** mindset. The collaborative mindset grants that each individual is a sense maker. When working from this mindset, we have the opportunity to explore the data that someone else has and learn how they are making sense of the situation. In doing so, we are also more likely to be open with our own agenda, reveal our own data, and share our sense making.

The balcony conversation clearly offers a way to help two people in an A-to-B interaction better understand each other and move forward collaboratively. But how can you use the balcony conversation approach to address organizational challenges in the context of human activity systems? What if your goal is to help a whole team or department work better?

**MAPPING THE SYSTEM**

When trying to adjust or enhance a system, the first step is always to define the scope of the system in question. The second step is to create a map of its nodes and the dynamics between them. (This is the same approach that a researcher or scientist would typically take when working with a natural or engineered system.) While the map of a human activity system will always be a simplified sketch, you nonetheless need to create a model to help you get your head around the challenge.
To create your map, you need to gather information about how the nodes (individuals or teams) within the system understand themselves in relation to others. The important things to capture are the visible actions that people can see (who has said or done what) and the narratives – the stories that individuals have constructed to make sense of these actions. The stories people tell about each other are the reality of the situation, because they drive decisions and actions that feed into the system and shape the system’s emergent behavior. One person can create this map by conducting interviews, or many individuals can be involved collaboratively in a group exercise.

Once you’ve gone through this process, you’ve got a system mapped out that includes the agents, the sense making, and the flows of influence. Now you can look for leverage from a vantage point on the balcony – looking down on the dance that the individuals have been doing together. The balcony perspective is broader than a single point of view, because it includes the data and the sense making from all the individuals in the system, at least as you have defined it.

What would leverage look like? It might be something structural and mechanistic, like changing a policy that is influencing sense making. Or you might decide that a piece of the system, perhaps the dynamic between two individuals, is the crucial bit of the system to work on. If you can get two managers up on the balcony – the equivalent of the heads of product and marketing, for example – they may reach a new understanding that could ripple out in positive ways to the rest of the system. Or, you might decide that a group of people (a subsystem within the larger system) needs to engage in an exercise to get up on the balcony to expand their sense making. In this case, the leverage point would be the changed sense making of the entire subgroup. If the team expands their sense making, they can co-create a solution to the problem that they can implement together. If your goal is full team alignment, this approach (the least mechanistic and most collaborative one) may be the required course of action. But it isn’t the only possible way to inspire change.

Regardless of where the leverage lies, changing a human activity system requires understanding the sense making that is creating it. After all, organizational work is really just the collection of commitments we make to each other, what we do after making them, and what sense we make of the results. To change the level of performance you need to change the sense that individuals make at every step.
MOVING TOWARDS CHANGE

Peter Senge remarks, “Every circle tells a story.” System thinking helps us to see that our own sense making is a fundamental component of the success of a team and an organization. Making sense of how we make sense: it’s a defining feature of what makes us human. Making sense of how systems make sense is a defining feature of how we enact organizational change.

Ultimately, what systems thinking cultivates is a holistic, non-linear approach to problems and opportunities; mindfulness in all that we do; a collaborative mindset with others; and reflection-in-action on the dynamically changing world through which we move.

None of us can get there in one step. But to shift our ways of thinking, we can recognize the following:

◆ We all are sense makers, interpreting reality on the basis of our own data, driven by a reflexive impulse to fix problems
◆ Our sense making exists within the context of a system, where our behaviors affects the sense making of others and is affected in turn
◆ Our sense making doesn’t merely reflect reality; it creates reality within the system. To change the system we may need to change the sense we have made.
4. Implications

So what to make of all this? What should we take away?

Perhaps the most hopeful implication is that systems thinking offers a way to make lasting changes to how things function, to improve performance overall, and to create an environment where people enjoy work more. Disrupting stable systems can be wrenching, but it can also be useful, productive, and rewarding. Teams mired in their habits often experience diminishing returns and declining productivity. In these instances, stability is clearly a negative, even if it is something the team knows and understands.

Of course, changing a team or situation for the better is difficult, especially given the tendency of systems to naturally revert to the status quo. People can quickly become exhausted when the push and pull of attempting change starts to feel like a zero-sum game. So another big implication of systems thinking is that change needs to be made strategically, working with the power of the system rather than against it.

To some extent we all react to the feedback we get in the system. Moving beyond the unilateral just-fix-it mindset means that we recognize the impact of our own sense making and that we then take the next step: learning to see the world through the eyes of another. People who are stuck can disrupt old ways of working by adopting new models for understanding each other. This gives them a new perspective that will allow them to see through the impasse holding them back from reaching their potential. Greater alignment can result when people are curious and transparent and try to create a shared point of view on what is going on.

Systems thinking thus inspires a spirit of curiosity into other people’s ways of sense-making and how it may be part of a larger system. It can help us understand that differences in points of view are not “personal” per se, but arise from the different points and connections we have in the system, be it a family, a team, or an organization. Once we recognize all these systems of limiting beliefs – even if they are our own – we begin to alter the way we perceive ourselves and our relation to others, the team, the company.

We can also look for the underlying source of resistance in the policies, implicit norms, points of view, and powerful relationships that constitute the culture of the organization. Since these are the limiting factors that maintain the web of arrangements, tactically
exerting pressure there can fundamentally alter the patterns that hold a team back. Interventions can be directed at real points of leverage in the system.

For example, what if you want to enhance the working environment in some way, like fostering more creativity and innovation? You can tell people to be more innovative. Or you can add people to the team who seem to have the quality of being innovative. But it would probably be more effective in the long run to think about innovation as an emergent property, rather than something that is “in” the members of the team. To foster an emergent quality, you need to ensure that the system produces the right kinds of interactions and team dynamics that allow innovation to emerge from the collective work of the group. At the same time, you should probably look at the balancing feedback structures that actually work against innovation, things that provide contrary incentives or otherwise short circuit positive feedback loops.

As Senge argues, setting a vision or goal in the business context is virtually useless without taking a systems thinking approach: “vision without systems thinking ends up painting lovely pictures of the future with no deep understanding of the forces that must be mastered to move from here to there.” In contrast, leaders who take a systems perspective lead more holistically, harnessing the power of systems rather than fighting against them.

Senge’s mission is to promote the spread of systems thinking and make it part of the way leaders approach the task of management. Clearly, many of the lessons of systems thinking are about leadership and what leaders can do – after all, leaders have a wider scope of influence and are more tied into the network so they can directly influence more people.

But one important implication of systems thinking is that there are things that any of us can do. We are all in the system and we can all influence it. What would taking a systems perspective on a daily basis look like? Try these things:

- Be more aware of sense making as a powerful element in its own right. Ask, “what is the sense that I’ve made about this situation? What if I were wrong about that?”
- Look at causation in more complex ways. Try to see backward up the chain of influence to see how the thing that you are vexed by came about in the first place. Are you in that chain? Is this something cycling back to you, something that you have leverage on?
◆ Depersonalize conflict. When someone is behaving in ways that don’t make sense to you, remember that these actions do make sense to him or her. You can understand how the other person is making sense and how that sense is coming out of the system you are both in.

◆ Take a point of view of personal responsibility and feel empowered by that! Our individual sense making and actions all contribute to group dynamics – we are all stakeholders and agents – and this means that we all have the power to be the change we want to see.
Appendix: A brief history of systems thinking

The history of systems theory can be traced back to Aristotle, the ancient Greek philosopher who uncovered a set of principles that could be used to elucidate any system, whether it was an ecosystem, a language system, or systems making up the human body. Aristotle focused on connections between elements and how they give rise to patterns or behaviors. What he noticed was that when parts of a system are synthesized into a whole network of interconnections, rather than treated in isolation, they produce synergies.

Aristotle’s holistic insight into how systems work, however, was largely disregarded during the scientific revolutions sparked by Newton in the sixteenth and seventeenth centuries. Scientists from that period made great strides by breaking down wholes into their elements, treating each component in isolation and understanding its properties. Yet something was lost by such reductionism: the ability to see the forest for the trees, so to speak.

But by the nineteenth century, systems thinking experienced a revival through the work of the philosopher Henri Saint-Simon, the sociologist Émile Durkheim, and the political theorist Herbert Spencer, among others. In the 1950s, modern systems theory, as we know it today, rapidly expanded to impact almost every discipline within a relatively short time period. Why? The short answer is that in the second half of the twentieth century social, political, and scientific problems started to become bigger, more complex, and more difficult to manage. In fields as diverse as biology, cybernetics, and mathematics, experts in the period turned to systems theory to illuminate the challenges and opportunities they faced.

The boom in systems thinking was also helped along tremendously by the explosive growth of computing power, as super computers made it possible to manage massive data sets. In particular, computers greatly enhanced the ability to work with nonlinear equations, where variables influence other variables. People could finally look at whole-system problems productively. Systems thinking soon became a core element in chaos theory and the study of complexity – often defined as the science of emergent behavior. Organizations like the Santa Fe Institute were founded to help foster the interdisciplinary work that the study of systems required.
In the 1980s Peter Senge, the Director of the Center for Organizational Learning at MIT’s Sloan School of Management, made a critical breakthrough by applying systems thinking to the management of human systems. His experiments showed that in order to truly understand an organization, we cannot just study the individuals within it. Instead, we have to focus on the web of interconnections that link individuals together within the system. Senge’s research was highly influential because it was simple and convincing. He and his colleagues demonstrated that even when all individuals in an organization work rationally and in good faith, the end result can still be undesirable.

Today, systems thinking has been especially influential in the field of organizational management, where it contributes to the study of organizational psychology and other investigations into why people act as they do within a system.
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