Making Maps: A Method for Drawing System Maps
John Shibley, September 2013

Introduction
This article describes a method for drawing system maps; of going from a story in which one senses a system dynamic at work to a fully formed map. This is not an article for absolute beginners. It assumes you have a basic understanding of reinforcing and balancing structures, and that you've tried to make system maps on your own or in a class.

I'd be very pleased if the way I go about making maps will help you make maps too. Even if my approach doesn't work perfectly for you, I hope it will be helpful for you to see how one person approaches this challenge. But most importantly, I hope it encourages you to reflect on how you do whatever you do, to become a more reflective practitioner.

The Method
1. Sense a system in the story
2. Listen to the story
3. Listen to the story again, with "variable ears"
4. Create variables
5. Create links
6. See if the links make a map

Beginning with the story, one proceeds through a process of identifying the variables involved, establishing the links between variables, and creating a map or maps based on these links.

In the illustration, the main, linear process is shown in heavy lines, since it is the primary path forward toward a finished system map.

But the process is iterative as well. Clarifying the links can, and often does, lead you back to understanding something new about the story, for instance. That's what all the lighter lines illustrate.

The rest of this article explains each step in more detail.
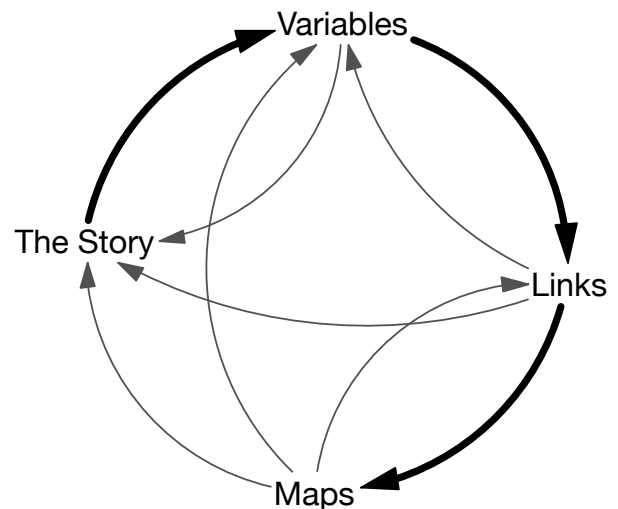
About the Story
The first three steps in this process are all about the story, with the story simply meaning whatever you are investigating, whether someone is telling you an actual version of what happens, or you are piecing together a story from an investigation.

Step 1: Sense a story in the system
The first step in creating a system map is suspecting that there might be one in the first place. Every day we are barraged by dozens of stories that could potentially be described using system maps. The ability to "sense" when there may be a systemic structure driving the results is one quality of a developed systems thinker.

I call this "system sensing" because in my experience the realization that a map may be hiding in a story is not so much a thought ("Hmm… I wonder if I could map this") as it is an intuition. It's like a gentle tap on your shoulder. The tap, if attended to, will lead to the thought "Hmm… I wonder if I could map this." However, the thought is not first. The tap is.

Here's some of the things I hear in a story that alert me that something systemic might be going on.

- o   Continuing growth or decline that actions seem able to slow, but not stop. This is the tell-tale sign of a reinforcing structure at work.

- o   The opposite – a steady state that no intervention seems able to change, which leads me to suspect a balancing structure.

- o   Any challenge that seems chronic and/or re-occurring, that people or an organization seem to be managing rather than reducing.

- o   A challenge involving other similar organizations experiencing similar challenges, which leads me to wonder if there is a issue with a "commons" involved.

This systems sensibility is probably the hardest thing for the beginning systems thinker to understand, let alone develop. I'm not sure how one develops it other than practicing making maps over and over. I think it's a little like learning to be a musician. The best musicians have a musical "sense" of what will work, but that sense usually develops only after many years of heavy lifting, like scale work and practice.

In any case, I do believe people can become better at sensing the system thinking tap, first by simply knowing it can happen, and secondly by paying attention when it does.

Step 2: Listen to the story
Once you sense that there may be a map in the story, listen to the story. Just listen to whoever is telling you the story, or to the unfolding elements as you encounter them in the world. Listen without trying to find the archetype or the map or any of that.

Just listen.

How come? Two reasons.

It's a really good discipline. Most of us want to leap into action, to pursue our insights the way a dog runs after a bone. The consequence can be that we end up hearing and drawing the story we tell ourselves instead of the story the other person – or the world – is trying to tell us.

In other words, listen to the story as if you have no idea what is going on – because, in reality, you don't yet.

Also, making maps is a rational process informed by intuition, and intuition, as any good psychotherapist will tell you, requires the participation of the unconscious. The unconscious is a

necessary partner to the rational, but will often not participate unless invited. By hearing the story once with a blank mind, we invite our unconscious to become involved.

When you are listening to someone tell you a story, it's very important to distinguish between stories that reflect the way things work now, and stories about how things could or should work, what I call "aspirational" stories. It can be useful to map both of these, but storytellers will sometimes combine elements from two different stories, one of each kind, in the story they tell you. In my experience, you cannot make a single map that combines elements of both. Do one at a time – starting with the way things really work.

OK, so you've heard the story. Now what?

Step 3: Listen to the story again, with "variable ears"
Have the storyteller tell the story again, and this time listen with your attention particularly attuned to things in the story that are increasing or decreasing, trending in one direction or the other, or perhaps both at different times. Systems thinkers call these things "variables."

What's a variable?
Variables are those things in the story that change, that increase or decrease over time. A good map is built on good variables.

For example, consider this story...

> "We produced a real big event, you know, one of those blockbuster exhibits (or theatre festivals or concert series). It was wildly successful – we got lots of critical praise, made a lot of money. So, naturally, there was a lot of pressure to do it – or something like it – again, and we did; and still do."

So, what do you hear? I hear three potential variables, all increasing in this version of the story - the blockbuster events, the success of these events, and the pressure to do more of them.

By the way, if you let the storyteller know that you're paying attention to the variables in the story, you may find that they tell the story using language like "this goes up" or "this goes down" as they retell the story. Their own understanding of the story will begin to shape itself into the raw material of a system map.

Notice at this point that you're still ONLY listening. In fact, this may be the third time you've heard the story. That's OK. I find it sometimes takes three iterations before I've quieted the noise in my own head enough to really hear the story in my client's head.

Step 4: Create variables
Once you've heard the story again and have some sense of what the variables are, describe them. The drive to get the variables right inevitably causes us to return to the story itself, and deepen our understanding of it.

In reality, there are two separate steps here.

The first step is just getting potential variables out. I like to write variables on large post-its and stick them to a page of flipchart paper. It makes it very easy to move the variables around once they're created, and saves a lot of rewrite time.

For a first pass, I simply record the variables in language the storyteller uses, without worrying about how "good" they are as variables. It's not quite the free for all that brainstorming can be, but err on the side of too many variables rather than too few. You can, and will, edit later.

Let's look for the variables in our example of the blockbuster event.

The Story	The Variables – first cut
"We produced a real big event, you know, one of those blockbuster exhibits/theatre festivals/concert series. It was wildly successful – we got lots of critical praise, made a lot of money. So, naturally, there is a lot of pressure to do it – or something like it – again, and we do!"	A blockbuster program Wildly successful results Pressure to do it again

The second step is to get very precise about what each variable should say, which is really a process of helping people clarify their thinking.

I find these challenges in creating precise variables.

o **Being "tight"**: A variables should be measurable. Ideally, you should be able to create a trend chart of the values described in the variables.

o **Being "right"**: The variable needs to describe the thing that they are actually concerned about. This can prove more challenging than it sounds. Often you have to work with people to help them think carefully about what exactly increases or decreases.

   For example, take the variable "a blockbuster program" in our story. Since the storyteller is really talking about "the number of blockbuster programs" produced over time, this is probably a better variable. But they could be talking about "the percentage of resources going to blockbuster programs" or "the number of operations people working on blockbuster programs". Or they could be concerned about ALL these things, and they are using a kind of shorthand in the story – they understand that "blockbuster programs" means all these things, but they just haven't said all of them.

o **Being neutral**. It's also helpful to state the variable in directionally neutral language, since these things all increase and decrease. For example "Wildly successful results" is not directionally neutral. Change it to plain old "Results".

Let's look at the first-cut variables again.

Variable – First cut	Comments	I would suggest this variable
A blockbuster program	I'd probably suggest that the story is about the number of programs, and see if the storyteller would agree to it. Also, number of programs draws the mind to measurement – can we track the trend in the growth of these programs?	Number of blockbuster programs
Wildly successful results	This is clearly not neutral – "Results" would work. But the story is more detailed than that. The storyteller mentions two kinds of results, critical praise and financial success. And, financial results are easy to measure.	Critical and financial results
Pressure to do it again	Not bad. For the sake of clarity I'd probably suggest we make the "it" clear. And how do you measure pressure? Well, you can't, really, though you could ask people what things happened to them that felt like pressure.	Pressure to do blockbuster programs

Step 5: Create links
Once you've got the key variables described closely enough, ask people to link the variables described. By this time you've probably got an idea about where to start. Put that post-it on a clean piece of flipchart paper.

When we add links between variables, we are making our assumption that there is a causal relationship between them that is visible, that one impacts the next. This process of clarifying different assumptions is one of the most useful results of a system mapping exercise.
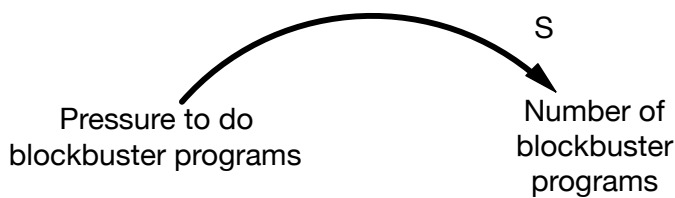
For example, in this link...

Pressure to do blockbuster programs → Number of blockbuster programs
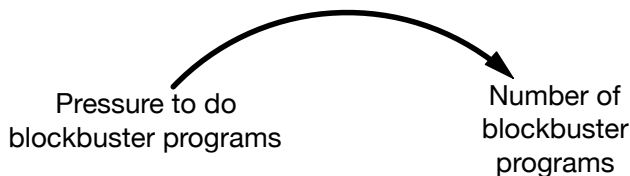
We're theorizing that a change in the pressure to do blockbuster programs leads, all else being equal, to a change in the number of blockbuster programs.

In system map grammar, we say that one variable causes the next to change in either the **same** or the **opposite** way. If the change is in the same direction, we label it with an "S". If the change is in the opposite direction, then we label it with an "O".

The story pretty clearly indicates that the pressure to do more blockbuster programs leads to more of those programs, a change of the same kind. So we indicate this change with a "S".

S

Pressure to do
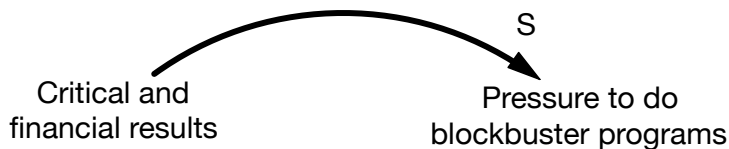blockbuster programs

Number of
blockbuster
programs

In plain English, this link theorizes that *"A change in the pressure to do blockbuster programs causes the same kind of change in the number of blockbuster programs"*, though I almost automatically add the ubiquitous system thinking qualifier: *"All else being equal…"*

Let's see how the other variables from our story link.

S

Number of
blockbuster
programs

Critical and
financial results
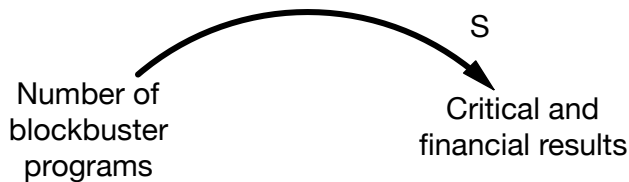
It seems pretty clear that the storyteller is asserting that as the number of programs increase, there will be more success, another "S" relationship.

S

Critical and
financial results
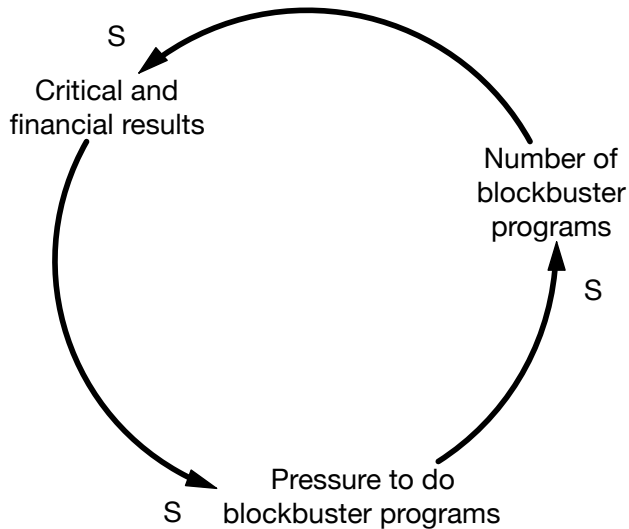
Pressure to do
blockbuster programs

Finally, it also seems clear from the story that the storyteller believes there is a connection between these results and the pressure to do more blockbuster programs, and that, as the first increases, so does the second, other "S" relationship.

This is a pretty simple story, but I'd still check to make sure that these three variables and links captures it to the storyteller's satisfaction.

In real life, the process is NEVER this rational and apparent. You inevitably make false starts and errors. That's not an indication that something is going wrong. Quite the contrary: understanding what is **not** going on is an important step toward building an accurate picture of what is happening.

Step 6: See if the links make a map
This step is not absolutely distinct from the one above. (As you can see, it grows out of the creation of a set of links that inevitably feed back on themselves to make a whole. In reality, if the initial steps have been done well, the creation of a descriptive map usually happens naturally and easily. In fact, you probably see it already…

S

Critical and
financial results

Number of
blockbuster
programs

S

Pressure to do
S   blockbuster programs

Original Story
"We produced a real big event, you know, one of those blockbuster exhibits/theatre festivals/concert series. It was wildly successful – we got lots of critical praise, made a lot of money. So, naturally, there is a lot of pressure to do it – or something like it – again, and we do!"

What the map says
A change in the number of blockbuster programs causes the same kind of change in critical and financial results, which causes the same kind of change in the pressure to do blockbuster programs, which causes the same kind of change in the number of blockbuster programs.

Notice that this map will "work" in either direction: a decrease in success would lead to less pressure to do blockbuster programs, resulting in a decrease in programs. This is one of the ways that you know you've drawn the map in a technically correct way.

So what?
OK, so you've drawn a map. Big deal, right? How are you better off?

o   The mapping conventions – the need to be neutral in making variables, the precise meaning of "S" and "O" – force storytellers to be precise about their thinking. They force people to get rational about their intuitions about how things work.

o   Second, making a map makes the storyteller's thinking, their theory about how the world works, visible to others in a graphic language that they can both understand. It makes the theory visible so others can understand it and critique it, and thus improve it.

o   Once the map is complete, you can assess whether or not the system is an example of a reinforcing or balancing structure, or if it suggests a system archetype. Knowing these things can be a shortcut to understanding what to expect from the system over time, or how to intervene.

o   Finally, and maybe most importantly for taking action, a system dynamics map suggests ways that the system can be changed for greater effectiveness, by adding a link, breaking a link or reducing a delay. My article "A Practice Theory for Organizational Learning" give an example of how this translates into practice.

Acknowledgments
This method grew out of a mutual inquiry with my clients in the Systems Thinking Learning Group at Columbia • St. Mary's Hospital in Milwaukee, many years ago. They wanted to know how I "did it" - how I made maps from the stories they told me. I realized I was interested in this too, and so we began a process of watching me work, developing a model about what I was doing, and refined this model through several iterations of further observation and model making.