FEATURE

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A NEW PATH TO UNDERSTANDING SYSTEMS THINKING

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Many readers will recognize this scenario: A group in your department is planning a highly complex project, but the conversations you're hearing about it center only on immediate, individual interests and the need for short-term deliverables. A week later, the project comes to a halt because the team discovers that the initiative is negatively affecting another department. Conflict and blame ensue.

Just like the rest of the world, functions within our organizations are increasingly interconnected and interdependent. Complex situations requiring a systemic approach are much more common than in the past. Nonetheless, many leaders and managers regularly use linear thinking, with its sequential, short-term focus on individual parts, which not only creates more complications, but also frustrates those of us who seem to "naturally" use systems thinking.

Why aren't more people applying systems thinking tools and skills to manage the complex needs in the world today? In some ways, systems thinking is like chess: It is easy to learn the basic rules, but you need experience to become good at it. While many resources exist to enhance one's ability to learn and practice systems thinking (including *The Systems Thinker*), our experiences tell us that certain people don't seem to "get it," use it, or even care about it. As Dave Packer observed in a 2004 article, "Whatever the reason, despite the promise of systems thinking, its impact has been surprisingly limited" (*The Systems Thinker*, V.14, N.10).

Why Don't More People Use Systems Thinking?

We believe that at least two major barriers exist to the widespread adoption of systems thinking:

1. People get confused about what "systems thinking" means.

Multiple terms. Even highly educated professionals are often uncertain about how to define "systems thinking." Similar concepts about systemic thinking are used in various applications throughout the world, including fields of study related to a systems approach to complexity—i.e., cybernetics, systems theory, complexity science, chaos theory, family systems theory, system dynamics, etc.

Internal debates. In the United States, arguably the most popular academic understanding of systems thinking developed out of the Massachusetts Institute of Technology (MIT), where Professor Jay Forrester founded system dynamics in the 1950s, and where Peter Senge (a student of Forrester's) raised awareness of systems thinking through *The Fifth Discipline* (1990). Twenty years after the publication of this bestselling book, an internal debate still festers among practitioners regarding the history and scope of systems thinking and system dynamics. As these internal debates continue, the arguments can confuse individuals seeking to clarify which tools, skills, and approaches are necessary and useful for better working with systems.

2. The tools and skills of systems thinking are not always consistent with the way people naturally think.

Learning to easily apply the tools and language of systems thinking has been compared to becoming fluent in a foreign language, in that it requires time and repetition with the material to build skills and confidence in applying it (Michael Goodman, "Systems Thinking as a Language," *The Systems Thinker,* V2N3; David Bridgeland, "Technology Versus Discipline: Why I Am Not a Systems Thinker," *The Systems Thinker,* V9N2). Yet our experience has shown that even with repeated exposure, some individuals within any group consistently disregard the majority of systems thinking practices, dismissing their value or return on investment. In contrast, within any group, some individuals quickly embrace and delight in discovering the "language" of systems thinking. (In our classes, these are the students who say, "This is the way I've always thought; you're just giving me language to express it.")

Our Study and Survey

While many great teachers and organizations are

TEAM TIP

When you need a group to slow down and consider a systemic organizational issue, use those who you know are more predisposed to systems thinking as designers, leaders, and/or thought partners.

helping to clarify what systems thinking means, we have found little research regarding any connection between how people think and the use of systems thinking skills. Curious about the different levels of appreciation for systems thinking, we engaged in a study to see if at the individual level, a link might exist between a person's personality and his or her preference for using systems thinking skills. Our research study asks: In what ways might the preference for systems thinking be connected to one's preference for how to learn and evaluate information? In our post-study reflections, we also consider: How can we use our findings to help spread the appropriate use of systems thinking more broadly?

For our study, we engaged in two main activities:

1. We developed a comprehensive inventory and administered a survey of practices commonly associated with systems thinking.

2. We compared assessment responses to participants' Myers-Briggs Type Inventory (MBTI) typologies. Note: While many other useful and credible tools for assessing personality and style types are available, we chose the MBTI based on its popularity, name recognition, and the possibility of comparing our data to other MBTI correlation studies.

What *We* Mean by Systems Thinking

Given the variety and vagueness of definitions of systems thinking, we decided to clarify what we mean by systems thinking as a basis for collecting our data. Analyzing multiple sources, including material from Linda Booth Sweeney, Barry Richmond, and the Waters Foundation, we methodically developed a list of 17 practices that we consider important to systems thinking. (Immense thanks to our colleague Lucy Garrick for her partnership in the development of the list and survey instrument. For more information about the source materials, see www.lindaboothsweeney.net, www.watersfoundation.org, and Barry Richmond's *The 'Thinking' in Systems Thinking* (Pegasus Communications, 2000).

17 PRACTICES OF SYSTEMS THINKING

1. **Considering both short- and long-term consequences of one's actions**
   Looking ahead and anticipating not only the immediate results of actions, but also the effects down the road
2. **Looking at multiple perspectives of an issue**
   Changing perspective to see other points of view within a system
3. **Looking at the "big picture"**
   Focusing on the overall "forest" as opposed to the details of any one "tree"
4. **Looking for patterns in data**
   Reviewing information with an eye toward patterns or themes
5. **Looking for trends over time**
   Viewing changes over time as part of the natural dynamics of the system
6. **Being comfortable with ambiguity**
   Holding the tension of paradox and ambiguity; taking the time necessary to understand the dynamics of a system before taking action
7. **Checking results and changing actions if needed**
   Assessing for improvement using benchmarks; seeing errors as a means to learning and adjustment
8. **Looking for interconnected issues**
   Perceiving connections between multiple issues/parts within a system
9. **Looking for small actions that can make big differences**
   Using systems understanding to determine what small actions could produce high-leverage results
10. **Considering the impacts of accumulations over time**
    Paying attention to things that build up (or deplete) slowly over time—both concrete ("money in a bank account") or abstract ("trust within a relationship")
11. **Being comfortable with questioning one's deep assumptions**
    Understanding that one's beliefs about how the world works (mental models) may limit one's thinking
12. **Being aware of boundaries**
    Understanding that boundaries are arbitrary; checking for consistency of understanding about where a particular boundary is drawn
13. **Thinking critically about causation, not just correlation**
    Looking beyond basic connections to understand the dynamic relationship between the connected parts
14. **Being cautious of adopting a win/lose attitude**
    Being skeptical of a "zero-sum" approach to individual goals within a highly interdependent system
15. **Considering unintended consequences**
    Anticipating ancillary effects of actions over time
16. **Seeing oneself as part of the system under study**
    Understanding that one's own behavior within the system impacts the system
17. **Recognizing that a system's structure drives its behavior**
    Focusing on system structure and avoiding blaming others when things go wrong

How We Collected Data

We developed a questionnaire to assess a respondent's preference for using any of the 17 systems thinking practices. Participants were asked to consider a brief scenario of a complex problem and answer 17 questions, each representing one of the systems thinking skills.

Imagine that you are on a citizen panel working on solutions to decrease crime in your hometown. You are given a great deal of data and requested to propose solutions. Think about how you would naturally want to process information and approach the issues.

Study volunteers were asked to choose the one answer that best fit with their preferred approach to learn and understand the information, given the scenario. We also requested that participants provide their MBTI types. If they were uncertain of their current MBTI type, they were able to take a validated online MBTI assessment at no charge. (We appreciated the grant assistant from Consulting Psychologists Press (CPP) for this project.)

Results were scored and means calculated for the level of preference for each of the 17 systems practices in the survey. We also conducted one-way analysis of variance tests as described in more detail later (see "Correlating Preferences for Using Systems Thinking with MBTI Type Dimensions").

Findings

Overall Use of Systems Thinking. Our first analysis was to explore the level of preference for the 17 systems thinking practices contained in our questionnaire. "Participants' Preferences for Each Systems Thinking Practice" summarizes the level of preference by the respondents for each of the 17 practices. Our purpose in developing this summary was simply to evaluate the level of familiarity the respondents had with systems thinking practices. As you will note, all practices were quite familiar to the survey respondents.

CORRELATING PREFERENCES FOR USING SYSTEMS THINKING WITH MBTI TYPE DIMENSIONS

Our study consisted of three parts:

1. Developing of a list of the 17 systems thinking practices we wanted to measure
2. Creating a questionnaire to assess the 17 systems thinking practices
3. Surveying a sample of 271 colleagues and others* to collect their questionnaire responses and Myers-Briggs typologies

* Respondents came from a variety of sources, including members of professional organizations, professionals who responded to an online announcement through social networking sites, and graduate-level students from at least five programs. More information on our sampling plan and characteristics of those **sampled** can be obtained from our website.

PARTICIPANTS' PREFERENCES FOR EACH SYSTEMS THINKING PRACTICE

Systems Thinking Practice	*% of 271 participants indicating moderate/strong preference for this practice*
1. Considering both short- and long-term consequences of one's actions	91%
2. Looking at multiple perspectives of an issue	70%
3. Looking at the "big picture"	70%
4. Looking for patterns in data	80%
5. Looking for trends over time	81%
6. Being comfortable with ambiguity	67%
7. Checking results for lessons	71%
8. Looking for interconnected issues	95%
9. Looking for small actions that can make big differences	90%
10. Considering the impacts of accumulations over time	92%
11. Being comfortable with questioning one's deep assumptions	95%
12. Being aware of boundaries	88%
13. Thinking critically about causation, not just correlation	96%
14. Being cautious of adopting a win/lose attitude	68%
15. Considering unintended consequences	95%
16. Seeing self as part of system under study	93%
17. Recognizing that a system's structure drives its behavior	78%

The table may seem to indicate strong acceptance of system thinking processes, but a fair degree of variation does exist. This is why we were interested in further investigating whether the MBTI dimensions might explain some of this variation.

Using the Myers-Briggs Type Inventory (MBTI)

The MBTI is a survey based on the theory of psychological type introduced by Carl Jung in the 1920s. The survey results provide a level of preference individuals have for each of four dimensions, which can help explain how they perceive and judge situations they encounter as well as how they prefer to behave in routine interactions. The survey provides preferences for four dimensions:

Extraversion (E) or Introversion (I), which relates to how individuals focus their perception on the world around them. Individuals associated with E tend to gather information by exploring the world around them versus I individuals, who tend to focus more inward.

Sensing (S) or Intuitive (N), which relates to

whether you prefer to focus on the basic information you take in (S) or whether you prefer to interpret and add meaning (N).

Thinking (T) or Feeling (F), which relates to making decisions. T individuals prefer to first look at logic and consistency as opposed to S individuals, who first look at the people and special circumstances.

Judging (J) or Perceiving (P), which relates to how one deals with the outside world. J individuals tend to like to have things decided whereas P individuals tend to prefer to stay open to new information and options.

If you're interested, we encourage you to explore the many resources describing the MBTI on the web for further information. One site in particular we recommend is the Myers & Briggs Foundation.

Systems Thinking Practices and MBTI Dimensions. Our second analysis assessed whether any of the four primary factors of the Myers-Briggs indicator were correlated with the level of preference for any of the 17 systems thinking practices. To do so, we employed a simple analysis of variance to test whether any of the four MBTI dimensions was statistically more identified with responses to any of the 17 practices. In short, we were interested in whether someone who was intuitive (N) expressed a higher level of preference for a given systems thinking practice than someone who was sensing (S), etc. Our findings are shown in "Statistically Significant Preferences for ST Practices, by MBTI Dimension."

In summary, 11 of the 17 systems thinking preferences were statistically significant for intuition (N) and 6 of the 17 for perceiving (P). Only one systems thinking variable was significant for extraversion (E) and two for feeling (F).

The data suggests that respondents who identified themselves as intuitive (N) and, to a lesser extent, those identifying as perceiving (P) are more likely to express preference for systems thinking practices than those identifying themselves as having other types.

STATISTICALLY SIGNIFICANT PREFERENCES FOR SYSTEMS THINKING PRACTICES, BY MBTI DIMENSION

Systems Thinking Practice	E/I	S/N	T/F	J/P
1. Considering both short and long-term consequences of one's actions		N		
2. Looking at multiple perspectives of an issue		N		P
3. Looking at the "big picture"	E	N	F	P
4. Looking for patterns in data		N		P
5. Looking for trends over time		N		
6. Being comfortable with ambiguity		N		P
7. Checking results for lessons		N	F	
8. Looking for interconnected issues		N		
9. Looking for small actions that can make big differences		N		
10. Considering the impacts of accumulations over time				
11. Being comfortable with questioning one's deep assumptions		N		
12. Being aware of boundaries				
13. Thinking critically about causation, not just correlation				
14. Being cautious of adopting a win/lose attitude		N		P
15. Considering unintended consequences				
16. Seeing self as part of system under study			F	
17. Recognizing that a system's structure drives its behavior		N		P

Note: all $p < .05$.
Letter denotes statistically significant difference among the respondents for the dimension preference.

What Might This Analysis Mean?

The findings from the overall analysis suggest that within the general population, some segment of people naturally practice and prefer systems thinking as a way for them to better understand complex issues. This tendency is not necessarily related to someone's capability of applying a given systems thinking practice or its frequency of use. Given the generally high percentages of strong/moderate preference for all of the practices, we may be able to generalize to say that if someone prefers to practice one aspect of systems thinking, he or she will also likely prefer several, if not all aspects of systems thinking. While this conclusion fits with our observation that some people tend to use more systemic thinking than others, the variance in the findings suggests that some practices remain less used overall: in particular, being comfortable with ambiguity (#6) and being cautious of a win/lose attitude (#14). Indeed, it may be possible that these and similar practices are actually *dis*couraged in classrooms and the workplace in favor of other Western ideals such as knowing the "right answer, right away" and competing to win.

This systems thinking/MBTI analysis offers one explanation for the varied levels of appreciation and use of systems thinking in the workplace. It also suggests an approach of focusing on one or more specific practices to encourage the spread of this approach.

Application

We see several applicable lessons here about how to use knowledge about MBTI types to help engage more people in systems thinking practices. Here are a few that we believe are particularly useful:

"Preference" Doesn't Mean "Ability." As Myers-Briggs professionals are quick to point out, one's type is only a preference, and it is possible to learn how to adapt to situations as necessary. Put another

way, just as someone with a strong P might adopt a to-do list to ensure she doesn't forget to perform critical tasks, we believe people can use a variety of tools and techniques to help them focus on utilizing systems thinking practices. Some suggestions are included in "Sample Actions to Enhance Systems Thinking Practices."

Remember That Systems Thinking Is One of Many Approaches. Recall the famous Mark Twain quote, "When all you have is a hammer, everything looks like a nail." As groups begin to gain skills and confidence in systems thinking practices, they will be tempted to see every organizational problem as a systems issue. This is of course not the case. Systems thinking is best used only under certain circumstances—with complex issues where the problem is not clear and the solution is unknown, what Ron Heifetz refers to as "adaptive challenges." This is in contrast to a complicated or linear technical issue—where the problem is understood and the solution is known. For more on adaptive challenges versus technical problems, see Heifetz's book, *Adaptive Leadership* (2009).

The point is this: *if you do* **not** *have an adaptive issue on your hands, don't spend time with systems thinking practices.* A systemic approach may overcomplicate the situation—and turn people off from the practices as they'll see limited value for the time and thinking invested.

To Improve Systems Thinking as a Whole (Overall List of Practices), Pay Attention to the Parts (Individual Practices). Make sure you understand the basic idea of each practice. If a particular practice is relevant but underused in your organization, refer to "Statistically Significant Preferences for ST Practices, by MBTI Dimension" to help identify whether that particular practice may be related to individual MBTI preferences. If so, you may need to raise awareness first as opposed to immediately ordering another training.

For example, individuals with a strong MBTI preference for S, J, or both may refer to "Statistically Significant Preferences for ST Practices, by MBTI Dimension" as a guide to deciding which systems thinking practices may be less comfortable for them. So, someone with a J preference may want to focus on Practices 2, 3, 4 etc. first. In "Sample Actions to Enhance Systems Thinking Practices," we provide suggestions for how to enhance this awareness and use it for two of the 17 practices. We suggest working on no more than one or two practices at a time.

To use this table, review the definition of the practice in the middle column and then think of how you might incorporate the suggested tools provided in the third column the next time your group faces a complex issue. Individuals working on building their systems thinking competencies are encouraged to self-reflect and seek feedback from others as to how effectively they are able to engage in the particular systems thinking practice and how their use of the practice affects results. We have found that this kind of focused approach can have a significant impact on people's comfort with systems thinking practices and their development of new insights, both of which increase the perceived value of a systems thinking approach.

Implications for Using and Spreading Systems Thinking

We can draw a number of conclusions from the study that should be helpful to those applying or thinking about applying systems thinking in their organizations. For one thing, familiarity with systems thinking concepts appears to be quite widespread, indicating that most of us likely have the basic skills that are required to be successful in applying them to our organizational challenges. Second, not surprisingly, our personal preferences may affect our use of systems thinking, particularly from the standpoint of our omitting certain practices when they are not aligned with our preferred means of learning. By becoming aware of how our preferences might

SAMPLE ACTIONS TO ENHANCE SYSTEMS THINKING PRACTICES

Systems Thinking Practice	Suggestions to Enhance Use	Possible Tools to Use
Seeking to understand the "big picture"	Focus on maintaining a balance between the big picture and important details.	Variance control matrix
Using understanding of system structure to identify possible leverage actions	Think about how single events or actions might represent larger patterns, trends, and feedback loops in a system.	Iceberg model; causal loop and stock/flow diagrams
Looking at multiple perspectives of an issue	Check to ensure you are working with individuals who represent sufficiently diverse perspectives on the issue at hand.	Stakeholder analysis
Looking for interconnected issues	Clarify areas of interconnections/interdependence within within a team, or between departments or organizations.	"Triangles" or "Web of Life" exercise, with debrief, from *The Systems Thinking Playbook*

For the complete list of practices, suggestions, and explanation of the tools, **CLICK HERE**.

influence our (or other's) desire to engage in systems thinking, we can begin to consciously focus our effort on specific learning tools to support the use of systems thinking when it might be helpful.

Most descriptions of systems thinking do not explicitly delineate the full set of 17 practices used in our survey. We recommend incorporating this list of practices into academic and professional development curricula to help expand awareness of the capabilities involved, as well as to bolster the confidence of new learners about their existing mastery of some of the practices.

Possibilities for Future Research

We caution that this study was an initial investigation into the use of MBTI types to think about preference for systems thinking use. It was not meant to be comprehensive or representative of the general population or even the subset of current users of systems thinking. Rather, the study sought to determine if any relationship might exist between the four MBTI dimensions and systems thinking practices among a small set of volunteers in order to determine if further investigation may be appropriate. We believe this study provides sufficient evidence to warrant further investigation and suggests:

1. The replication of this study with a larger sample that more clearly represents the four MBTI dimensions.

2. The development of an expanded methodology to identify a priori those likely to employ systems thinking and those less likely.

3. The inclusion of appropriate demographics into the selection of respondents to test whether factors such as age, sex, education, etc. may have intervening or direct consequences in the adaptation of these practices.

4. The inclusion in future questionnaires of indicators of frequency of use and a self-assessment of the degree of capability the respondent has in a given systems thinking practice.

5. An exploration of systems thinking correlating with other behavioral assessments, such as DiSC and FiroB.

While further research is needed to better understand personal preferences for systems thinking, it seems clear to us that this way of thinking is developed through a combination of both nature and nurture. We hope that this idea can serve those of us who are "natural systems thinkers" in at least two ways. First, it can remind us to be more patient and less judgmental when our colleagues don't seem to "get it." Second, it can help us look to specific exercises and tools to build capacity for particular systems thinking skills in both ourselves and others. We hope that, over time, with enough encouragement and practice, organizational groups will begin to naturally engage in systems thinking practices when complex issues come up—resulting in more systemic strategies and better, more sustainable solutions.

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NEXT STEPS

- Use the MBTI correlation as a reminder that, while not everyone will be wildly enthusiastic about systems thinking, everyone can work to strengthen their systems thinking "muscles."
- Preference for using the systems thinking skills varies. Become better aware of the multiple skills associated with systems thinking, and be clear about which ones you see as serving the needs of your organization.
- For individual and group learning conversations, make available tools and questions associated with each systems thinking practice.
- Several useful texts explain the basic principles of both systems thinking and system dynamics. For a helpful discussion on the similarities and differences between the two disciplines, we recommend Barry Richmond's "System Dynamic-Systems Thinking: Let's Just Get On with It" (1994).

