Theory of Complex Systems Change for Cross-Site Evaluation of QIC-EC R&D Projects[1]

System Concepts

The Quality Improvement Center on Early Childhood (QIC-EC) cross-site evaluation assumes that we are addressing change within complex social systems. In this document we provide an overview of the theory of how change occurs in such social systems. First, let us clarify what we mean by a system. "A system is an interconnected set of elements that is coherently organized in a way that achieves something" (Meadows, 2008; emphasis added). We are using this definition from Donella Meadows, a scholar who is widely recognized as a leader in the systems field. The definition goes beyond "parts" (elements) to a focus on the interconnection among those parts. It also emphasizes that there is coherence to this interconnected set of parts and it accomplishes something. This definition reminds us that "systems" are more inclusive than formal social organizations; they include both formal and informal configurations.

Let's now turn our attention to the diagram at the end of this document. The diagram provides an overview of the QIC-EC theory of change used in the cross-site evaluation. It depicts a theory of how change occurs in complex social systems to achieve long-term support for the building of protective factors among caregivers. It focuses on changes that occur in patterns, structures, and processes of social systems when partnerships composed of organizations that span levels of the social ecology support the building of protective factors among caregivers of young children. The diagram (which has become known among us as the wavy-line diagram) shows the general theory of implementation of the paradigm of promoting protective factors rather than putting primary attention on reducing risk factors. The theory embeds key ideas about how complex systems change. It does so by focusing on changes in patterns, structures, and processes of the systems that are involved.

Here is an explanation of the theory of change.

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1 The QIC-EC cross-site team at InSites (Beverly Parsons, team leader; Patricia Jessup; and Marah Moore) prepared this informal document as a reference for use by the QIC-EC National Advisory Committee (NAC) during their October 17-18, 2011 meeting in Washington, D.C. Please direct questions or comments to Beverly Parsons at bparsons@insites.org. Not for citation or quotation without permission from InSites.

Background

Based on an extensive review of research, the Center for the Study of Social Policy (CSSP) developed an approach known as *Strengthening Families* to prevent child maltreatment (see http://www.strengtheningfamilies.net/). The approach is based on families developing five protective factors:

- parental resilience;
- social connections;
- concrete support in time of need;
- knowledge of parenting and child development; and
- social and emotional competence of children.

The QIC-EC added a sixth protective factor—nurturing and attachment. (CSSP considered this factor to be implicit in the five. It has been explicitly stated for the QIC-EC work to give it more attention.)

These protective factors are *evidence-based principles* rather than *practices* (that is, an intervention that prescribes precisely what to do) and can be thought of as being the "simple rules"[2] which fundamentally shape the actions of agents in a complex adaptive system. These simple rules are in contrast to the dominant ones that implicitly or explicitly shapes the behavior of families in which child maltreatment occurs and social systems that focus on risk, deficits, and/or fear rather than protective factors. The importance of these protective factor principles in preventing maltreatment often has not been sufficiently recognized by policymakers or social service agencies.

Implementing the protective-factors paradigm is not about using a particular model or starting a new program. Rather it is about engaging existing programs, services, parents, and other entities as partners around the use and promotion of the protective factors as their rules for action. It includes changes at multiple interrelated subsystems of a complex system including the interaction between the caregiver and child; neighborhood/community connections with families; the learning and capacities of those within organizations and programs that provide services to and interact with families; the policies, norms, and structures of such organizations and programs; and the local and state policies and norms within which families, communities and organizations function. These subsystems can be thought of as primary points of influence that affect the whole complex system.

One of the early steps we took in designing the QIC-EC cross-site evaluation was to develop a theory of how complex social systems shift to establishing protective factors as underlying guiding principles for their structures, processes, and patterns within and among all parts of the

[2] Simple rules are ways of behaving that can be applied to action in multiple settings. They are not necessarily easy to follow. They can also be thought of as guiding principles for action. See Parsons (2010). This document is in the NAC meeting notebook.

complex system. It is a shift in paradigm. Meadows (2008) identifies shifting paradigms as one of the most powerful leverage points for changing a system.

Mapping Patterns of Change in a Complex System

The diagram (at the end of this document) of the theory of change serves as a communications tool among those of us involved in the cross-site evaluation, the QIC-EC partnership, the R&D projects, and others interested in and advising on the work.

The development of the theory of change began by identifying subsystems within the overall complex system that have coherence, interact with other subsystems, are likely to change in different ways and/or rates, and have been shown by past research to affect the whole complex system that interacts with child maltreatment. These are open systems and subsystems. They have been identified to help reveal practical ways that they can be influenced as key leverage points for systemic change. The idea is to work simultaneously in these multiple parts of the system with recognition that different patterns of change are likely for each subsystem. The subsystems have different system dynamics (especially differences in the extent and nature of organized and adaptive dynamics) and have different processes and structures that can be influenced.

Our second step in developing the theory of change diagram was to identify some general aspects of change over time that could be applied to each subsystem of a complex system. As shown in the attached diagram, each subsystem is observed first in regard to a baseline analysis of the subsystems when the investigation begins. Then (moving to the right in the diagram) we pay attention to the nature and extent of how people try out interventions intended to change the subsystems individually or collectively, build enough change to reach a tipping point, and then sustain a new balance around the use of the protective factors as the dominant underlying paradigm of how the overall complex system functions. Although the subsystems are displayed separately, we recognize that the boundaries between the progression of change over time and the boundaries between the subsystems are fuzzy and permeable. Also, although all subsystems need to progress, it is not expected that they will change at the same rate or in the same time frame.

It is also important to recognize that this diagram represents a segment of time within an even longer period of time over which change is happening. For example, if we zoomed out, we would see a change process to the left that has brought these sites to the point where they were ready to work on changing their social systems to establish the protective factors as core guiding principles for their social systems. We also realize that the phases of change represented here can be thought of as a spiral "beneath" the picture presented here. These phases can be repeated at deeper and deeper levels of change over time.

Let's look now in more detail at the progression from left to right in the diagram. This is the progression of the system change that is being affected by the interventions of the R&D projects.

- **Baseline Understanding of Fundamentals and Systems Dynamics**: When changing a complex system, there is no "beginning". Changes are being sought in a dynamic system

that is continually evolving. The projects and the cross-site evaluators are both assessing the relevant systems and subsystems. The projects are focused on specific events, activities, structures, and processes that are relevant to their specific intervention as well as the presence of the underlying paradigm of protective factors. The statements in the diagram within each row and column represented a general statement of what we as cross-site evaluators are attending to as we learn from the sites. These statements are designed to address the deeper (less visible) leverage of change—(a) the extent and nature of how the protective factors are present as fundamental principles of the systems and subsystems and (b) the system dynamics which involve the balance and nature of the organized and adaptive dynamics.[3] (See the questions in the column representing the first aspect of change.) Assessment and feedback are essential processes involved in changing a complex system and thus are an aspect of the intervention itself, not just an aspect of the cross-site evaluation.

- **Trying out Interventions that address New Fundamentals and System Dynamics:** The next aspect of change is designing and implementing small-scale, well designed changes to try out ways to embed protective factors (the new fundamentals) in people's actions and leverage both organized and adaptive system dynamics. This is what each of the R&D projects is currently doing. They are trying out interventions that vary in their design and the extent to which they are directly addressing each level of the social ecology. Some are directly working at all these levels while others are focused on two or three of these levels. In some cases these latter ones are expecting to address interventions at the other levels at a later time or are expecting ripple effects from their points of intervention that will lead to changes in these other levels. Again, the descriptors in this column of the diagram provide an example of what one might see when interventions to build protective factors are being tried out at each level of the social ecology.
- **Tipping Point to New Fundamentals and System Dynamics Balance:** This theory of change holds that as interventions are tested with more people and/or with more effectiveness, a tipping point is reached where momentum begins to shift to the protective factors as the predominant underlying way in which people are working within and across subsystems. The tipping point occurs as the overall system moves to a point far-from-equilibrium and a new system grounded in the new simple rules (here, the protective factors) emerges. See the discussion by Ramage and Shipp (2009) of the work of Ilya Prigogine for more about this important concept of changes that happen as a system moves far-from-equilibrium. Again, this column of the diagram provides illustrative statements about what one might find as a tipping point is reached.
- **Sustainable Adaptive Balance of New Fundamentals and System Dynamics in Shifting Context:** The right side of the diagram shows a sustainable dynamic balance grounded in the protective factors. A complex social system is not static. It is dynamic and changing. This column of the diagram draws attention to the need for continual

3 See Parsons (2010) for information on complex adaptive systems for more information on these two types of system dynamics. This document is in the NAC notebook.

vigilance to the nature of the complex system. The system continues to adjust as the context changes. There is a likely oscillation over time in child maltreatment rates but if the changed system is an improvement over one not grounded in protective factors, the oscillation is around a lower level of child maltreatment rates. Continual vigilance includes feedback about outcome levels and key system dynamics, patterns, processes, and structures. The "long-term outcome" is a situation where multiple agents across subsystems of the overall complex system are interacting and maintaining a dynamic balance that is continually adjusted in light of changing conditions to keep the child maltreatment rates low.

This theory of change diagram provides the basis for the cross-site evaluators to follow and map changes in events, results, patterns, structures, and processes within and among the subsystems that reflect shifts in the underlying paradigm toward protective factors and recognize the importance of both organized and self-organizing dynamics in affecting system change. The diagram also serves as a basis for engaging in dialogue using an understanding of the features of complex systems to identify strategic leverage points in various levels of the system that are likely to have a significant impact in moving the system as a whole to the tipping point. This map helps guide speculation about what may happen when certain changes are made. It does not predict change since complex systems are characterized by unpredictable dynamics and consequences.

Partnerships

The partnerships involved in each of the R&D projects are an essential aspect of the theory of change within complex social systems. The partnerships that bring together people across the levels of the system play a critical role in bringing about whole system change. They are able to look at changes in boundaries, relationships, perspectives, and differences in levels of energy to give clues as to how they might influence patterns within and among the levels of the complex systems. As the tipping point is reached within one or more subsystems, the boundaries among the subsystems may be more permeable encouraging movement of the new knowledge about protective factors across subsystems and consequent shifts in patterns, structures, and processes among people who are involved in various levels of the social ecology. The networking across the levels of the system enhanced by the partnerships are theorized to help people across the whole system move to a deeper level of understanding and integration of what it means to build a system on a paradigm grounded in protective factors.

Concluding Comment

This description only touches the surface of the theory of change involved in the QIC-EC work and the cross-site evaluation. The cross-site evaluation will continue to tack back and forth between complexity theory and the empirical data derived from the site visits and interactions with the QIC-EC R&D projects and the QIC-EC partners.

References

Meadows, D. (2008). *Thinking in systems.* White River Junction, VT: Chelsea Green Publishing Company.

Parsons, B. (2010). *Using Complexity Science Concepts When Designing System Interventions and Evaluations*. Fort Collins, CO: InSites.

Ramage, M, & Shipp, K. (2009). *Systems thinkers*. London/New York: Springer. pp. 229-232.

Theory of Change in Patterns, Structures and Processes of Complex Systems to Build Protective Factors

Application to QIC-EC R&D Projects