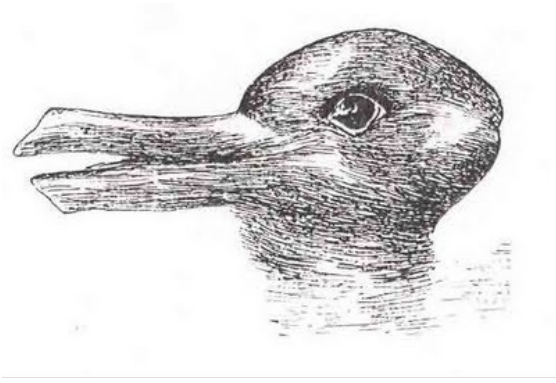
**Understanding the Dynamics of Polarization May Help Fix It** by J.A. Scott Kelso, PhD Hon. MRIA

We live in a polarized world these days. No matter the issue, whether race, gender, politics, religion, climate change, immigration, whatever, the either-or mode of thinking dominates. Polarization it seems is here to stay. Why is that? And what can we do about it? The picture shown below is of a sculpture called "Hands across the Divide". It stands at the end of the Craigavon bridge in Derry, in the northern part of Ireland –the place where I am from--and is symbolic of the hope for an end to conflict and division. In this, the sculpture resonates with the goal of cultivating greater tolerance and unity among human beings worldwide. Throughout history, art and literature have played an important role in helping to promote human understanding. What of science? Despite all our scientific knowledge and all the technological developments that have helped produce this knowledge, it's hard to avoid the conclusion that not much has changed. Wars, poverty, violence, fear, greed, etc. permeate modern life just as they have for centuries. From science's perspective, we human beings, it seems, are just the way we've always been. This is a hard pill to swallow for all those who believe, since the Age of the Enlightenment, that knowledge is the path to wisdom.

But there is light at the end of the tunnel. It comes from the 'new science of coordination' called Coordination Dynamics and the philosophy and practice it gives rise to, called The Complementary Nature[1]. We may not realize it, but we live in a world of coordination at every level and scale of endeavor. Coordination Dynamics describes basic patterns of coordination in living things, from coordinating parts of the body, coordinating stimuli with responses, coordinating parts of the brain and even coordinating the bodies and brains of people interacting with each other as in dance and other social activities. The problem of coordination does not care much about the disciplines we create or the boundaries we set up. Even the difficulty of relating the physical and the mental may be overcome if both possess a common underlying coordination *dynamics*. The language of Coordination Dynamics pertains to both the mind and the body. It's not that one has to mystically interact with the other: both, as eminent philosopher and evolutionary biologist Maxine Sheets-Johnstone says, are cut from the same dynamic cloth.



[1] First laid out in two books by the author (one with D.A. Engstrom) published by The MIT Press.

What does Coordination Dynamics tell us about polarization and how to get around it? The first thing to realize is that Coordination Dynamics is *nonlinear.* That means that the same input can give rise to qualitatively different outputs. We may come from the same place, with the same background, with the same basic brain anatomy, but hold entirely different beliefs. What is novel is that the science of Coordination Dynamics shows us how such differences are possible, how they come about. At the most basic level of Coordination Dynamics, two states are possible for identical parameters. This fundamental nonlinear feature of *bistability*, according to Coordination Dynamics, is the likely basis of polarization and the either/or mindset. You either see the duck or the rabbit, the old lady or the beautiful young one. Each overall picture or pattern predominates. When that happens, details don't matter much. Beaks can become ears, protruding nose high cheekbones, a wizened mouth a handsome necklace. Dynamically speaking, bistability is a source of "isms". "Isms" can be malicious (think fascism and communism for instance) and are an obstacle to understanding: they result in one doctrine being defended or attacked rather than opening up new ideas.

What causes our perceptions, actions and thoughts to switch? What causes us to change our mind? Political scientists can provide a multitude of theoretical possibilities and descriptive reasons why people seem to polarize (how they think and feel about the other, opposed feelings about sensitive issues like abortion, homosexuality, etc). As yet, however, such descriptions don't say much about the nature of the underlying dynamics. Coordination Dynamics offers a specific mechanism: *dynamic instability*. Considerable experimental evidence shows that switching in both brain and behavior is a self-organized[2] process that takes the form of a nonequilibrium phase transition. Brains don't like fluctuations very much. But fluctuations play a key role, testing the stability of brain states and enabling the system to discover new ones. In Coordination Dynamics, once the system settles into an attractor, a certain amount of noise or a perturbation is required to switch it to another attractor. Or, if internal or external conditions change when the brain is near instability, a bifurcation or phase transition may occur, causing it to switch. Consider such phenomena in the context of American election politics which few would deny are certainly polarized and dynamic! In purple or swing states, each party tries to create the conditions for switching to occur from them to us. This is not easy. People tend to **sync up** with those with whom they share a common identity. According to Coordination Dynamics, switching involves the active destabilization of people's brain patterns. Even on an individual level, hearkening back to Saul on the road to Damascus, it costs a lot of time and energy to do that.

[2] The word 'self-organizing' is not a throwaway. It refers to the ability of an open system to organize itself. Spontaneous patterns arise solely as a result of the dynamics of the system with no specific ordering influence imposed from the outside and no homunculus-like agent or program inside. Nonequilibrium phase transitions are the hallmark of self-organization in living things. Early evidence in humans is summarized in *Dynamic Patterns: The Self-Organization of Brain & Behavior*, The MIT Press.

Whether we change our minds or not, it seems we are stuck with polarization. There will always be a duality—the haves and have nots, black and white, etc.[3] 'Isms' like materialism and racism are big ones and seem here to stay. But with the new understanding provided by Coordination Dynamics, we don't have to accept this status quo. Not only is it possible for two or more possibilities to exist, and that switching between them can occur, other possibilities can be realized as well. What's more, as often or not, polarized extremes are at their root ideal utopian entities, more delusional than anything else. How might the science of coordination help us transcend polarization and the narrow mindedness and intolerance associated with it?

One of the chief discoveries of Coordination Dynamics is called *metastability* (meta meaning beyond). Metastability offers new insight into how the human brain works. It shows how individualist tendencies for the diverse regions of the brain to express their independence *coexist* with tendencies of the parts to couple and cooperate as a whole. Metastable mind rationalizes William James (1890) beautiful metaphor of the stream of consciousness as the flight of a bird whose life journey consists of 'perchings' (the phase gathering, integrative tendencies of the brain) and 'flights' (phase scattering, segregative tendencies). Both tendencies are crucial: the former to summon and create thoughts; the latter to release individual brain areas to participate in other acts of cognition, emotion and action.

In the metastable brain, classical dualities like segregation and integration, competition and cooperation, individual and collective, parts and wholes, etc exist in a kind of coordinated communion, a complementary code. They are not polarized opposites, diametrically opposing either/or's. In *The Complementary Nature* (MIT Press, 2006) we introduced the tilde (~) or squiggle symbol to express this basic truth: both members of a complementary pair and the dynamic relation between them are required for a full understanding of the complex world we live in. It's not one *versus* the other. Dissent between religions or cultures, results from an overemphasis on one complement over another.

The time has come to transcend dichotomy and reject polarized thinking, to embrace the extremes of life in a single unified vision. The tilde or squiggle is not just fanciful philosophy, or a lexical frivolity. It is a way to see contrarieties, opposites and their kin as separable yet mutually related and inextricably connected. It offers a perspective of life that helps us overcome prejudice and intolerance. The amazing thing is that this hope for the end of polarization lies in a scientific theory that is supported by the fact that the functioning brain operates in the metastable régime of its coordination dynamics.

So, when confronted with polarization what to do? Use *the complementary code* provided by your metastable brain: use your squiggle sense. If you see things like yin and yang, organism and environment, nature and nurture, mind and body, friend and enemy, living and dying, creation and annihilation, Muslim and Christian, etc etc. as complementary you are exercising your squiggle sense. If you see them as clashing or as contraries, us versus them, nature versus nurture, mind versus body, or if you overemphasize one extreme over the other, you are not using your squiggle sense. Duality and polarization are as old as humanity itself. Science, in the form of metastable coordination dynamics, offers a complementary code which if used ('the squiggle sense') may help fix polarization, by allowing us to understand it. It's not an easy fix, but Coordination Dynamics offers a way forward.

[3] Notwithstanding ancient spiritual traditions that explicitly address "Entering the gate of nondualism" (cf. B. Watson (trans.) *The Vimalakirti Sutra*. Columbia University Press, 1996.