# Reifying Socio-Technical and Socio-Ecological Perspectives for Systems Changes:

## From rearranging objects to repacing rhythms


**David Ing**

**Creative Systemic Research Platform Institute**
(Ticino, Switzerland; Mora d'Ebre, Spain; Espoo, Finland)

**Systems Changes Learning Circle**
(Toronto, Canada)


**Socio-Technical Perspectives in Information Systems (STPIS)**

**Jönköping, Sweden**

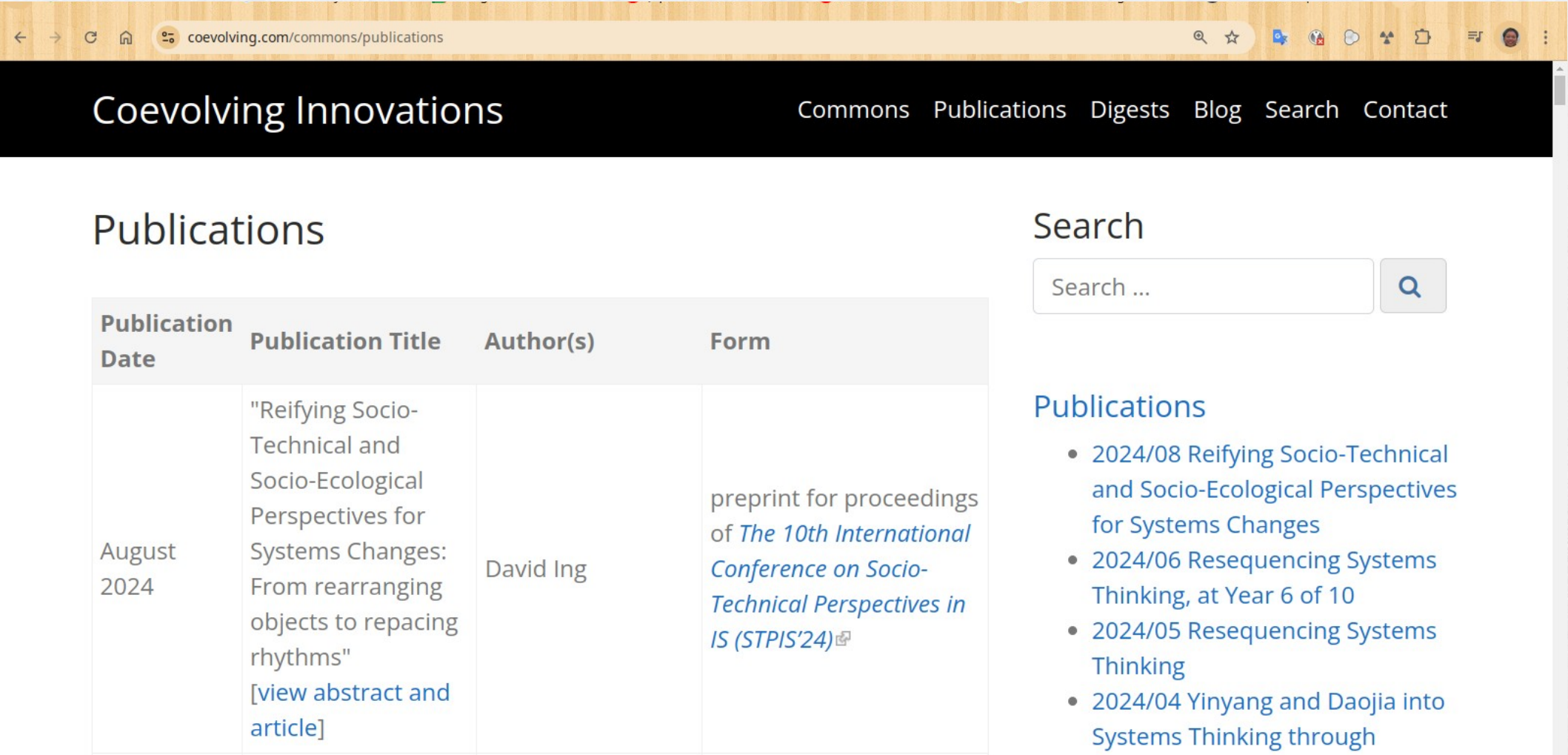
**August 16, 2024**

# When systems changes predominate,
# ↓ (SES function → STS structure),
# ↑ (SES+STS process → behaviour)

BMW Z4 GT3 - Car Assembly HD Time Lapse by TeamWestCoatRacing (2010)

Friday Night Swing @ MUB 2017-02-03 CC-BY Gainesville Swing (2017)

# Preprint at coevolving.com/commons



# Agenda

| | |
|---|---|
| A. | History of STS ↔ SES |
| B. | Case Studies:<br>Open Sourcing while Private Sourcing |
| C. | Root Metaphor Theory |
| D. | (Con)textural Dyadic Thinking for STS + SES |
| E. | Reifying → Implications:<br>Philosophical, Theoretical, Practical |

# The Socio-Psychological, Socio-Technical, and Socio-Ecological Systems perspectives were developed concurrently



# Post WWII social psychology following Kurt Lewin led to three systems perspectives at the Tavistock Institute for Human Relations

[... the] socio-psychological, the socio-technical and the socio-ecological perspectives ... emerged from each other in relation to changes taking place in the wider social environment. One could not have been forecast from the others. Though **interdependent**, each has its own focus. Many of the **more complex projects require all three perspectives**. [p. 30]

## *Socio-Psychological Systems Perspective*

... in Institute projects, the **psychological forces** are are directed **towards the social field**, whereas in the the Clinic, it is the other way around [with **social forces** directed **toward the psychological field**]. [p. 31]

## *Socio-Technical Systems Perspective*

... the **best match** between the **social** and **technical systems** of an organization, since called the **principle of joint optimization**

... the **second design principle**, the **redundancy of functions**, as contrasted with the **redundancy of parts**. [p. 32]

## *Socio-Ecological Systems Perspective*

... the **context** of the **increasing levels of interdependence, complexity and uncertainty** that characterize societies a the present time.

... new problems related to **emergent values** such as **cooperation** and **nurturance**. [p. 33]

Trist, Eric L., and Hugh Murray. 1997. “Historical Overview: The Foundation and Development of the Tavistock Institute to 1989.” In *The Social Engagement of Social Science: The Socio-Ecological Perspective*, edited by Eric L. Trist, Frederick Edmund Emery, and Hugh Murray, 3:1–35. Philadelphia: University of Pennsylvania Press.

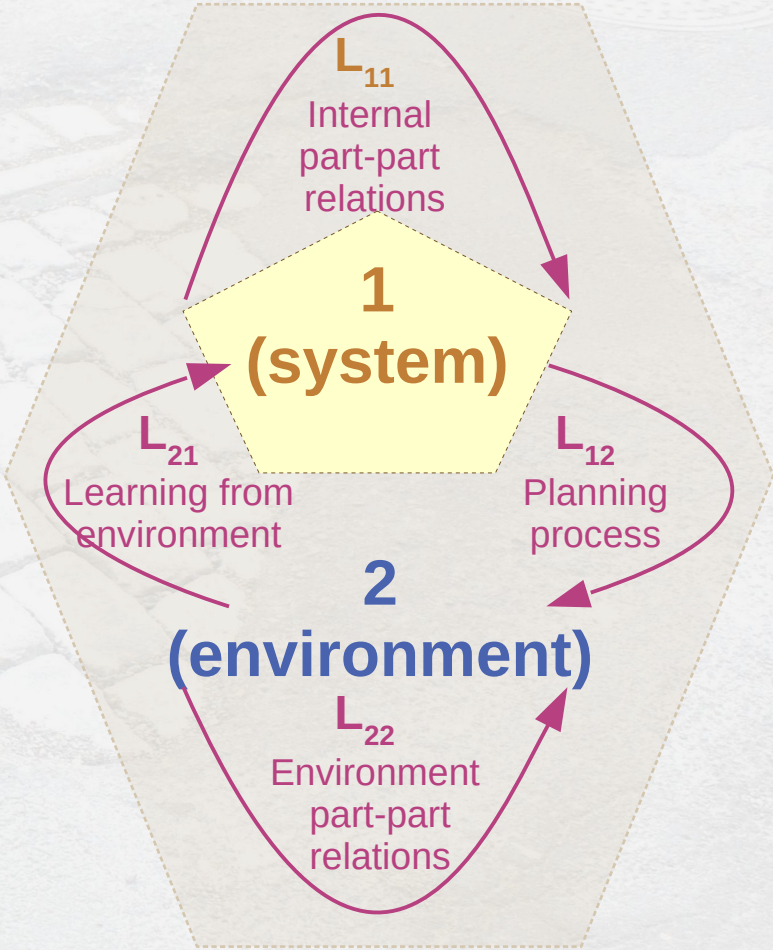
# Into *systems changes*, what does *causal texture* mean?

## *The Causal Texture of Organizational Environments*[1]

F. E. EMERY AND E. L. TRIST

### IDENTIFICATION OF THE PROBLEM

A MAIN problem in the study of organizational change is that the environmental contexts in which organizations exist are themselves changing, at an increasing rate, and towards increasing complexity. This point, in itself, scarcely needs labouring. Nevertheless, the characteristics of organizational environments demand consideration for their own sake, if there is to be an advancement of understanding in the behavioural sciences of a great deal that is taking place under the impact of technological change, especially at the present time. This paper is offered as a brief attempt to open up some of the problems, and stems from a belief that progress will be quicker if a certain extension can be made to current thinking about systems.

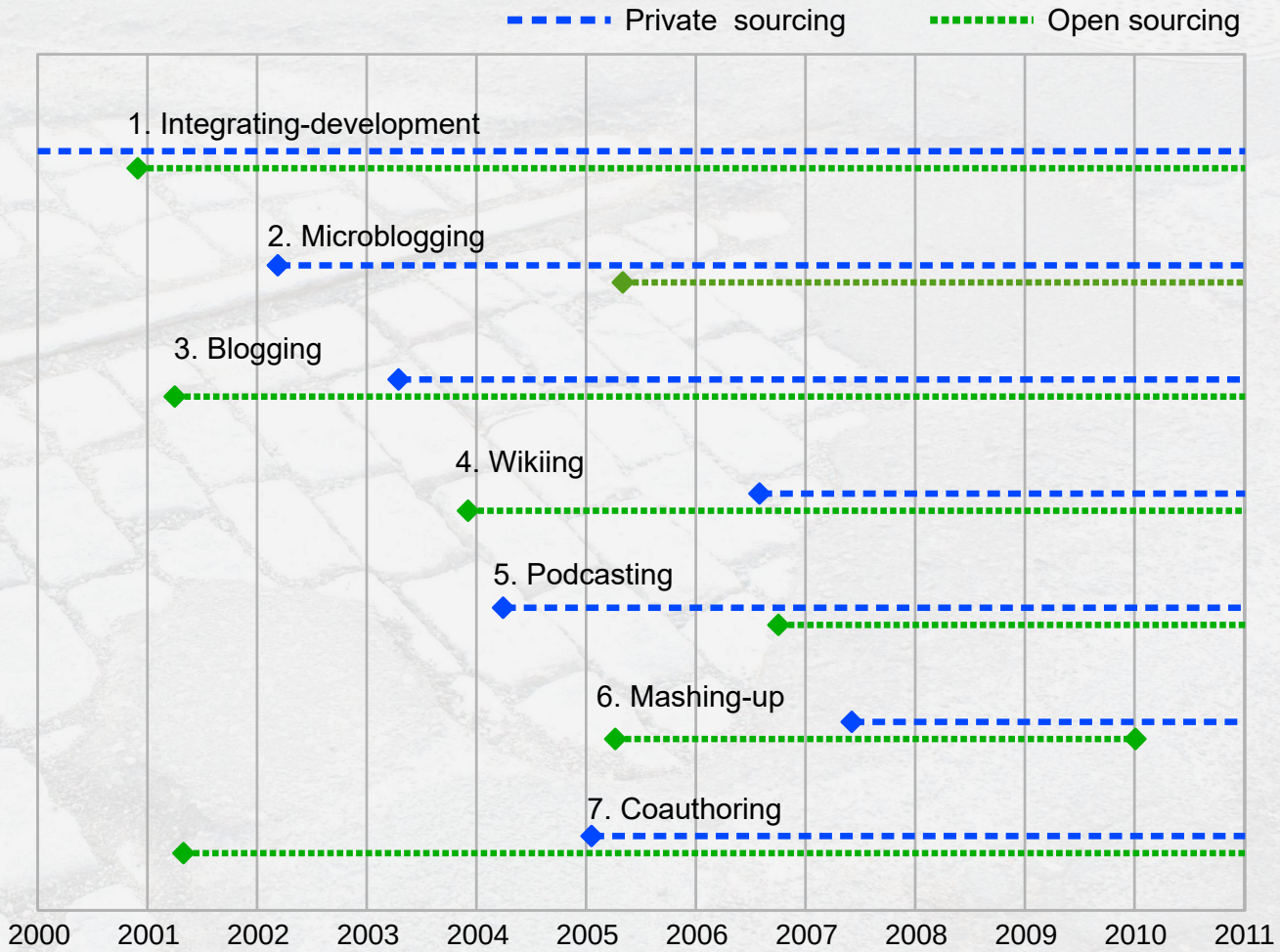



Emery, Fred E., and Eric L. Trist. 1965.
"The Causal Texture of Organizational Environments."
*Human Relations* 18 (1): 21–32. https://doi.org/10.1177/001872676501800103.

# Agenda

| | |
|---|---|
| A. | History of STS ↔ SES |
| B. | Case Studies:<br>Open Sourcing while Private Sourcing |
| C. | Root Metaphor Theory |
| D. | (Con)textural Dyadic Thinking for STS + SES |
| E. | Reifying → Implications:<br>Philosophical, Theoretical, Practical |

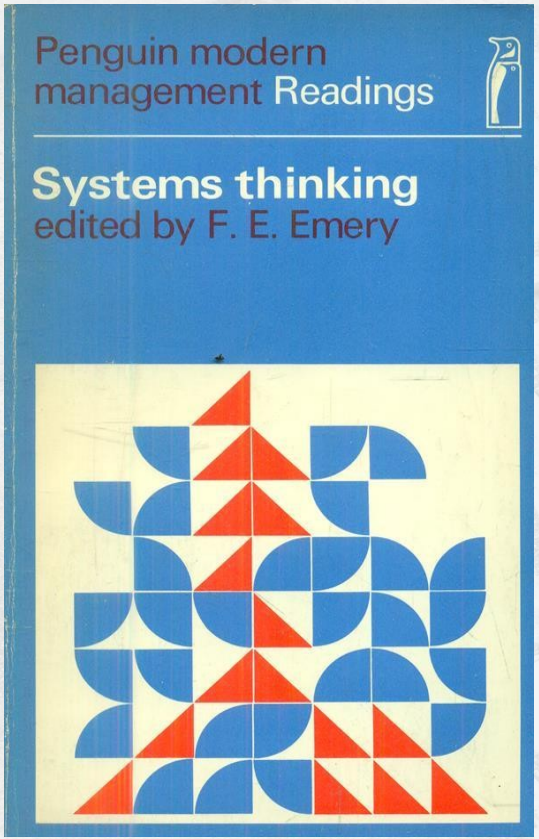
# Open access at openinnovationlearning.com

# Agenda

| | |
|---|---|
| A. | History of STS ↔ SES |
| B. | Case Studies:<br>Open Sourcing while Private Sourcing |
| C. | Root Metaphor Theory |
| D. | (Con)textural Dyadic Thinking for STS + SES |
| E. | Reifying → Implications:<br>Philosophical, Theoretical, Practical |

# The 1969 edition of *Systems Thinking* noted the omission of Stephen C. Pepper (1942) *World Hypotheses*




**Part One** *Precedents to Systems Theory*

Only pressing problems of space precluded a selection from S. C. Pepper (1950).

This is of particular importance because the ‘root metaphors’ he identifies and rigorously defines are all clearly operating in different systems theorists and account for much of the mutual incomprehension that exists among them.

‘Contextualism’ is the root metaphor which comes closest to our bias in selecting for this volume.

*References*

PEPPER, S. C. (1950), World Hypotheses, University of California. [Emery (1969) p. 15]

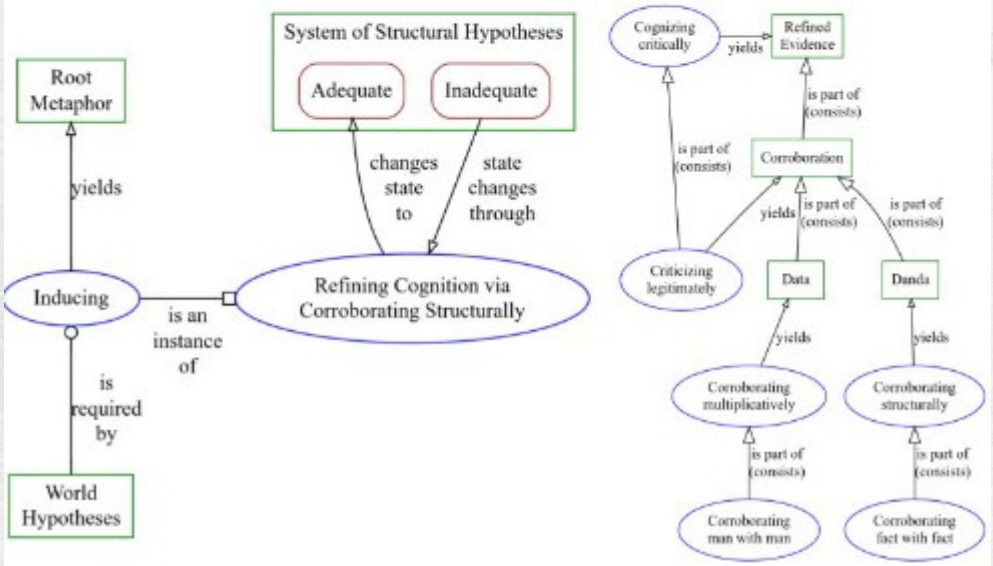
Emery, Fred E. 1969. “Precedents to Systems Theory.” In *Systems Thinking: Selected Readings*, edited by Fred E. Emery, 1st ed., 1:15. Harmondsworth: Penguin. https://archive.org/details/systemsthinkings00emerrich

# A January 2022 session on metaphilosophy received encouragement

**David Ing** • You
Systems Evangelist; Management Consultant; Technology Executive...
1yr •

On Monday, January 9, 6:30pm ET, **#SystemsThinking** Ontario will have an online session on "Root Metaphors and World Hypotheses", see **https://lnkd.in/gx4AFhRf** .

The world hypothesis of contextualism is at the foundation of the Socio-Ecological Systems perspective of **#EricLTrist** and **#FredEmery**. American pragmatism influencing the systems approach.

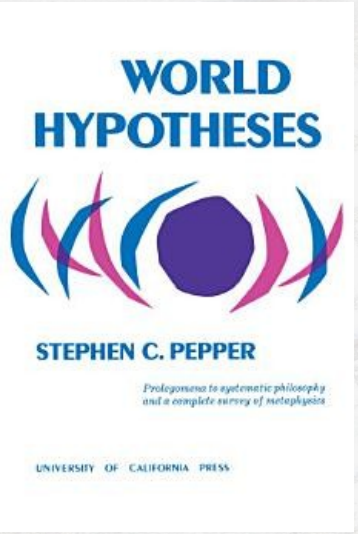



**Dr Mike C Jackson OBE** • 1st
Centre for Systems Studies
1y

Very interesting, David. And great that you are bringing Pepper and Emery/Trist back into centre of debates about systems thinking - where they belong. Thanks, also, for drawing attention to my 2020 discussion of world hypotheses.
Sociotechnical thinking went through a brief 'mechanical systems' phase (Trist and Bamforth) before discovering von Bertalanffy and embracing organicism. It is also true that both Trist and Emery later claimed to have moved beyond organicism and embraced contextualism. My own view is that they did not succeed and that organicism continued to dominate in the L22 work and even in the later socio-ecological work. I recently had an exchange with Merrylyn Emery on this who, of course, says I am wrong and that her and Fred's later work is clearly contextualist. My argument, which I still adhere to, can be found in the chapter on sociotechnical thinking in my 'Critical Systems Thinking and the Management of Complexity'. It is this chapter Merrylyn objected to. She is still very active in Australia. Best wishes, Mike.

https://www.linkedin.com/feed/update/urn:li:activity:7015730114118246400?commentUrn=urn%3Ali%3Acomment%3A%28activity%3A7015730114118246400%2C7015754029347520512%29

# Pepper framed four world theories (world hypotheses) in dimensions of analytic~synthetic and dispersive~integrative




| *World Hypothesis* | ***Dispersive*** manner for organizing evidence | ***Integrative*** manner for organizing evidence |
|---|---|---|
| ***Analytic*** mode of reasoning | **Formism**<br>*Root metaphor*: **Similarity**, as recurrence or recognizable features<br><br>*Nature of time*: **Universal** or irrelevant | **Mechanism**<br>*Root metaphor*: **Machine**, where exerting force or energy produces predictable outcomes<br><br>*Nature of time*: **Schematic time** as location (linear and dimensional) |
| ***Synthetic*** mode of reasoning | **Contextualism**:<br>*Root metaphor*: **Situation**, as a historic event in its living actuality<br><br>*Nature of time*: **Qualitative duration**, event relative to a specious present | **Organicism**<br>*Root metaphor*: **Constructive Development**, with orderliness of changes from stage to stage<br><br>*Nature of time*: **Directional arrow**, successive integrations |

*C. Root Metaphor Theory … (page 4 of 4)*

# Recognizing dimensions of dispersive-integrative + analytic-synthetic, the Tavistock legacy can be reframed into world hypotheses

| | *Dispersive?* | | *Integrative?* |
|---|---|---|---|
| *Analytic ontology?* | **Ecological** Systems Perspective | | ***Technical*** *Systems Perspective* |
| | ↓ | | ↓ |
| *Synthetic onto-epistemology?* | **Socio-Ecological** Systems Perspective | ↔ | **Socio-Technical** Systems Perspective |
| | ↑ | | ↑ |
| *Analytic epistemology?* | **Eco-Cultural** Systems Perspective | | **Socio-Psychological** Systems Perspective |

Ing, David, and Susu Nousala. 2024. "Rethinking Work, with the Pandemic Disruption: Metatheorizing with World Hypotheses and Systems Changes." *International Journal of Organizational Theory and Behavior*, forthcoming.

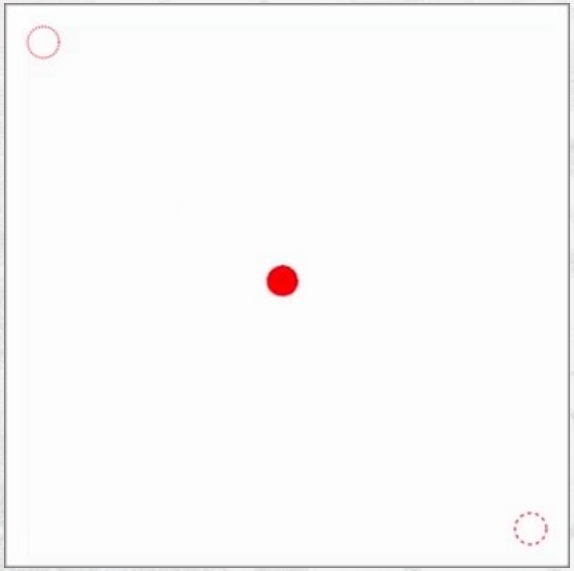
# Agenda

| | |
|---|---|
| A. | History of STS ↔ SES |
| B. | Case Studies:<br>Open Sourcing while Private Sourcing |
| C. | Root Metaphor Theory |
| D. | (Con)textural Dyadic Thinking for STS + SES |
| E. | Reifying → Implications:<br>Philosophical, Theoretical, Practical |

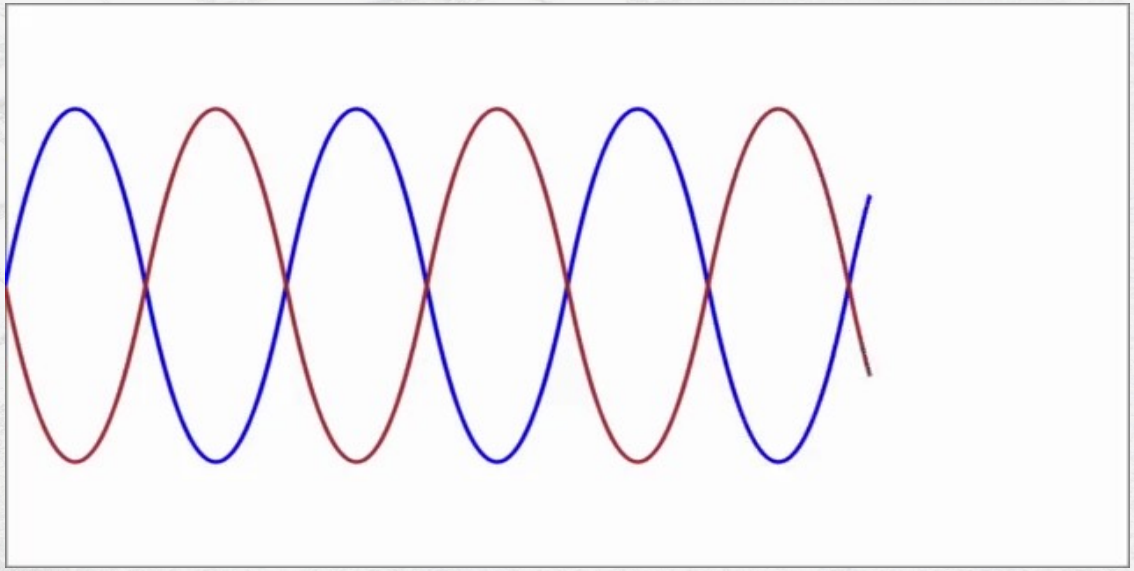
# For systems changes, two synthetic world hypotheses inform (con)texturalism-dyadicism, with dispersive alongside integrative

| *World Hypothesis* | ***Dispersive*** manner for organizing evidence | ***Integrative*** manner for organizing evidence |
|---|---|---|
| ***Synthetic*** mode of reasoning | **Contextualism**:<br>*Root metaphor*: **Situation**, as a historic event in its living actuality<br><br>*Categories* : **Strands**, texture, quality, novelty<br><br>*Nature of time*: **Qualitative duration**, event relative to a specious present | **Organicism**<br>*Root metaphor*: **Constructive Development**, with orderliness of changes from stage to stage<br><br>*Categories*: **Progression** (steps), final **outcome** (ideal)<br><br>*Nature of time*: **Directional arrow**, successive integrations |
| ***Synthetic*** mode of reasoning | **(Con)textualism - Dyadicism**:<br>*Root metaphor*: **Yinyang dancing through [eight] seasons**, as ((yin qi) ∝ 1/(yang qi)) wayfaring in unfolding wanwu [concentrating ⇌ dissipating] textures<br><br>*Categories*: **Rhythmic shifts, (con)texture, propensity**<br><br>*Nature of time*: **Kairotic**, with propitious periods and inopportune periods | |
| | ***Dispersive + integrative*** manner for organizing evidence | |

# Ancient Greeks → Western science on straight lining (point-to-point); Classical Chinese → science as yinyang rhythmic complements

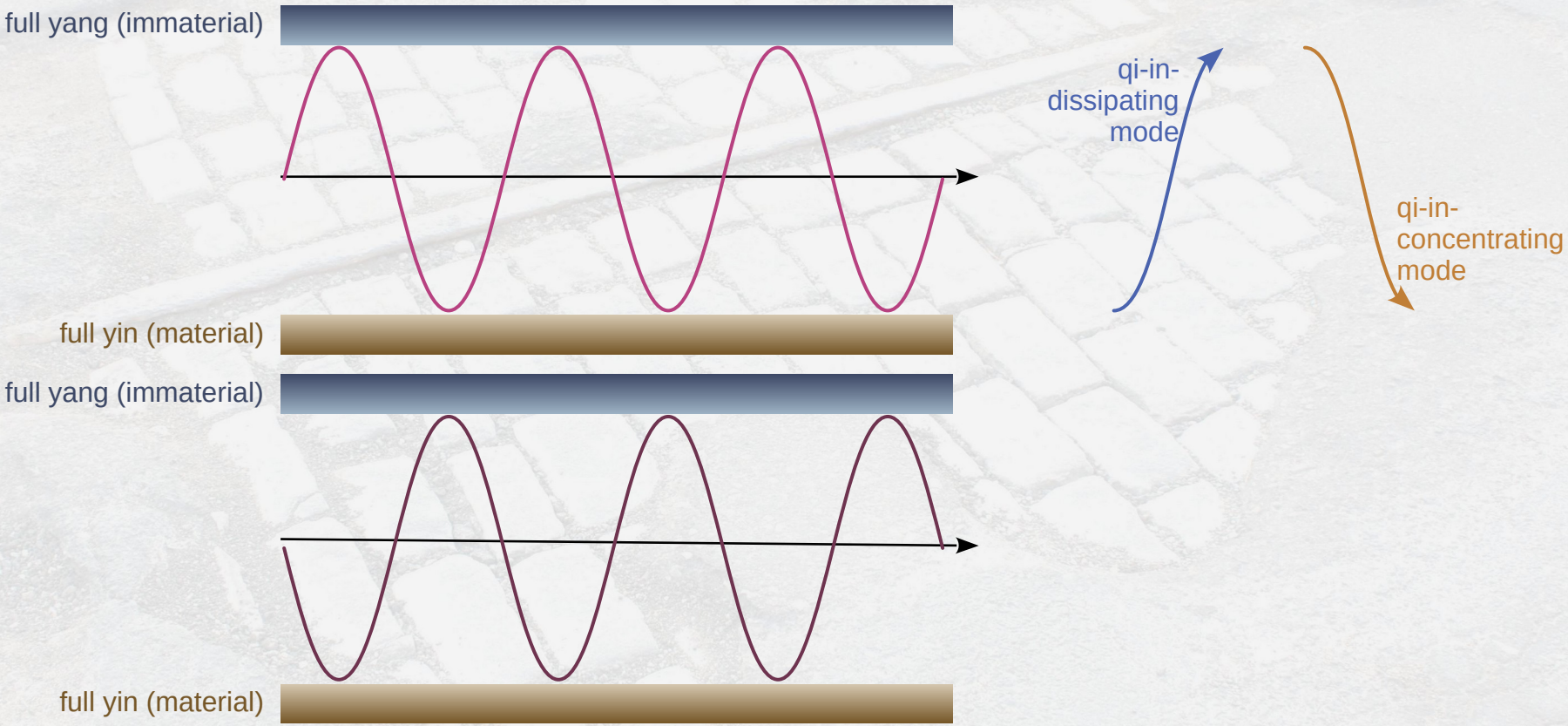


Square red dot straight line CC-BY-NC-SA David Ing 2024)

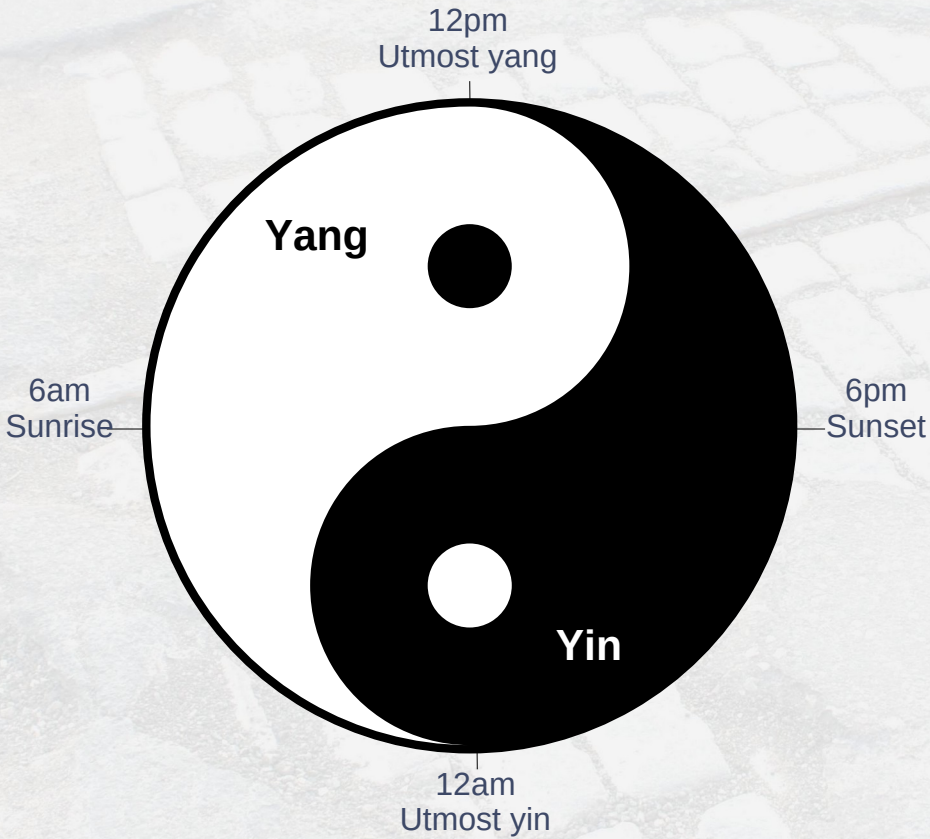


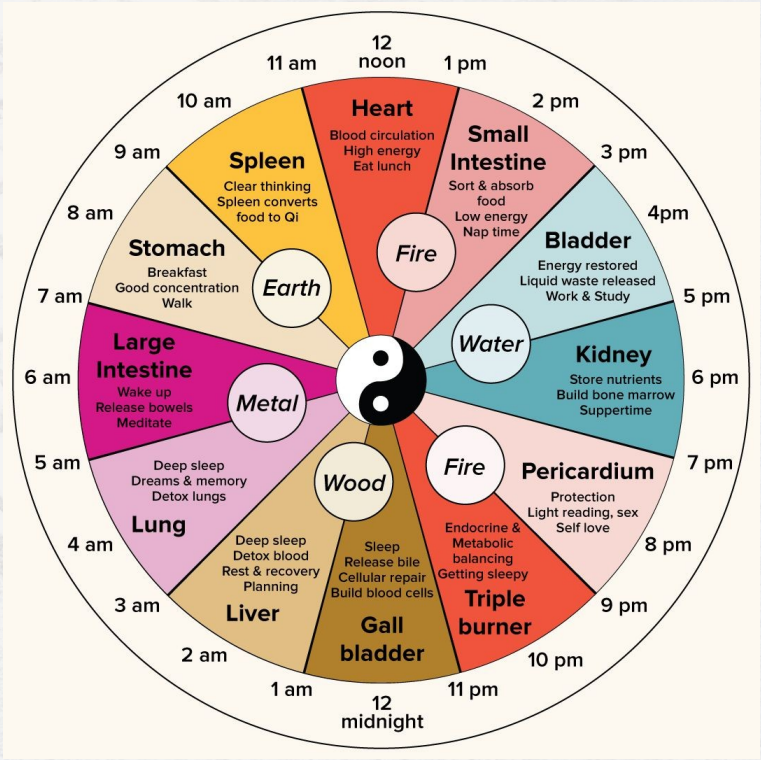
Sine Waves Blue and Brown CC-BY-NC-SA David Ing 2024

# Yinyang is dyadic with qi-in-dissipating mode alongside qi-in-concentrating mode



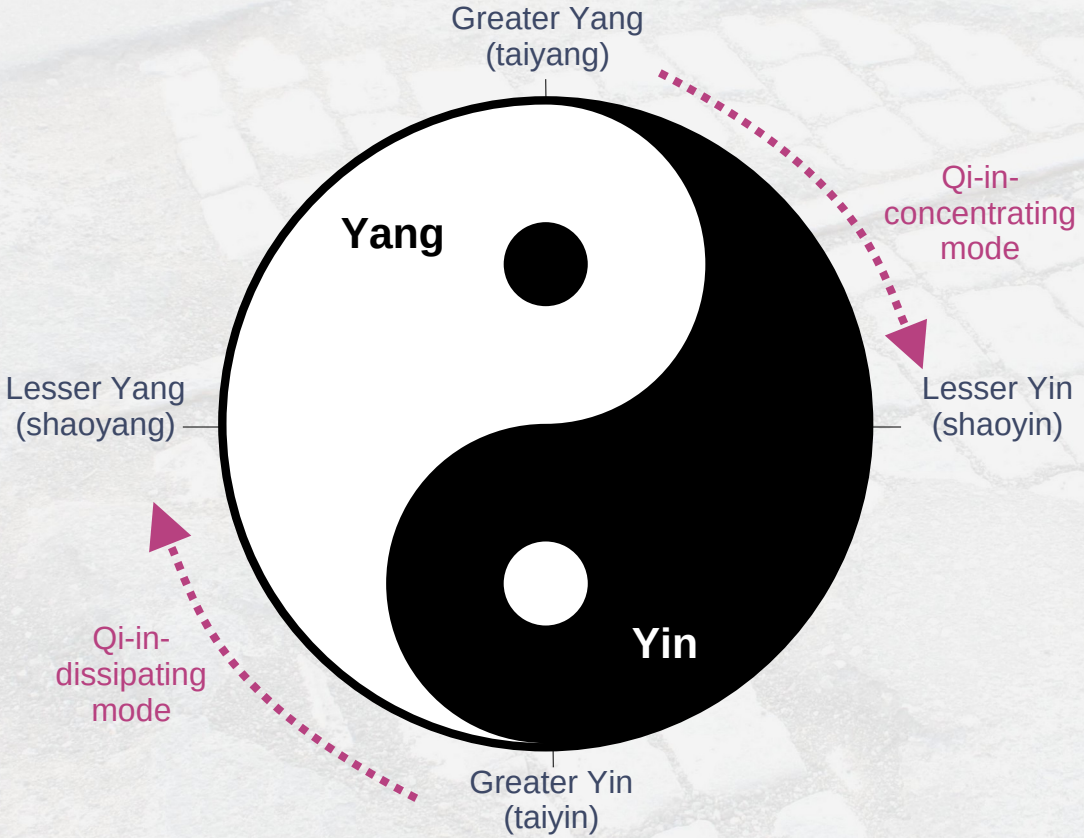
# Yang and yin correspond to processes of change of brightening and darkening, complicated by extension to more phases

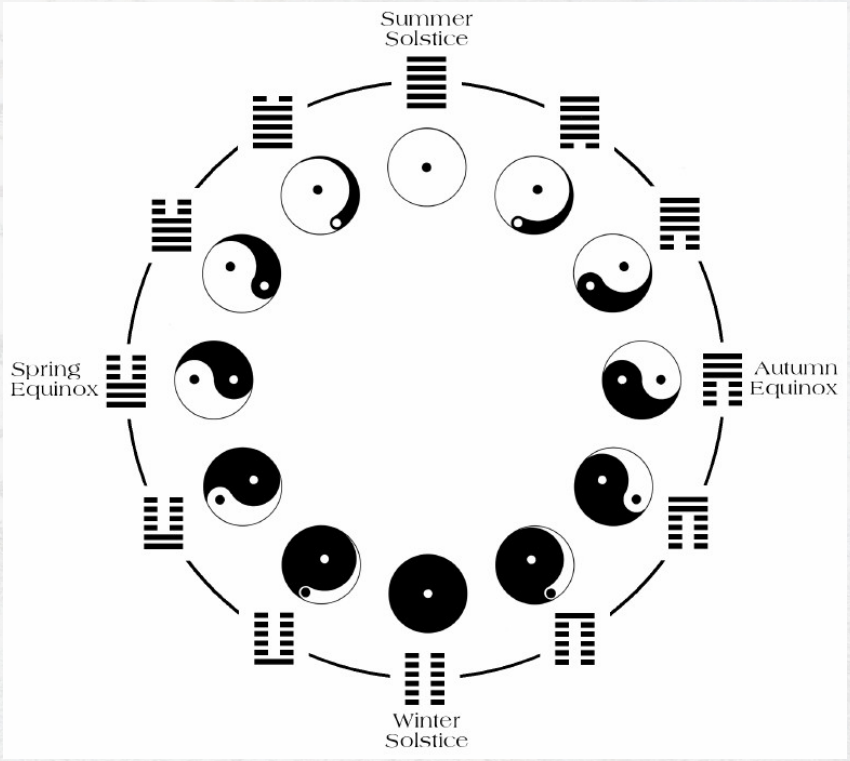



"All About the Chinese Body Clock", Healthline (2020) at https://www.healthline.com/health/chinese-body-clock

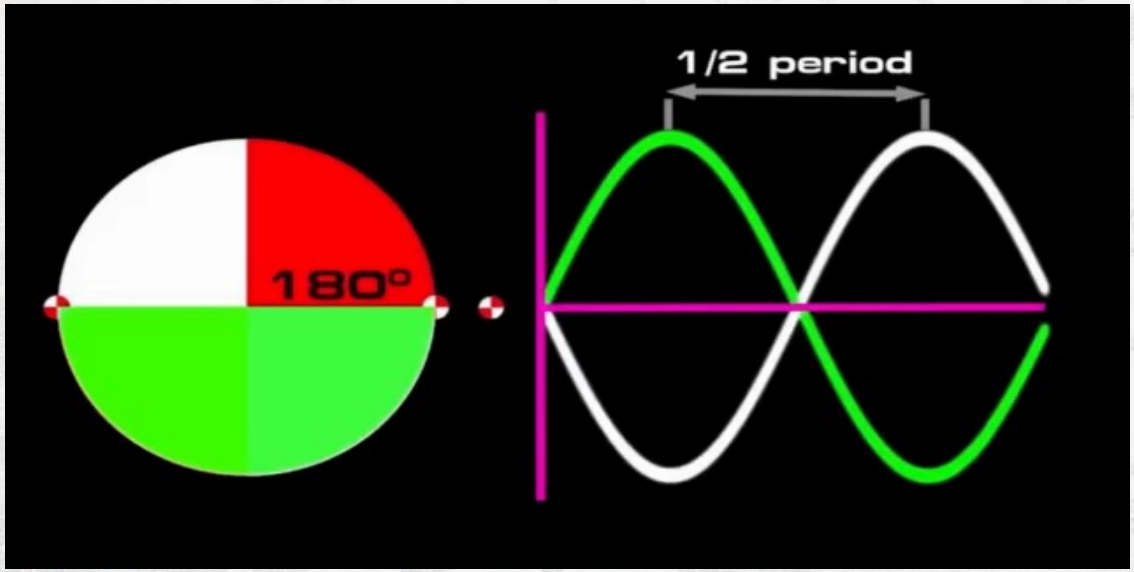
# Qi as "atmosphere" is both matter and not-matter, waxing with qi-in-dissipating mode; and waning with qi-in-concentrating mode




Dr Andreas Schöter (2011)
"Waxing and Waning – Yin and Yang Throughout the Year"

# Dyadic processes of dissipating (to greater yang) and concentrating (to greater yin) are complementary in diachrony within (implicit) contexts

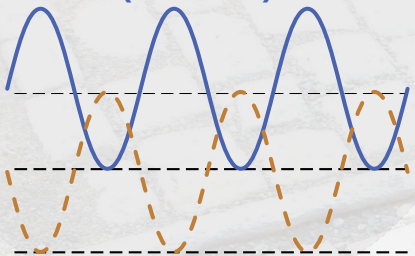



| *Yang* | *Yin* |
|---|---|
| Illuminating | Darkening |
| Working | Resting |
| Warming | Cooling |
| Rising | Descending |
| Dissipating | Materializing |
| Scattering | Congealing |
| Generating | Growing |
| Expanding | Contracting |

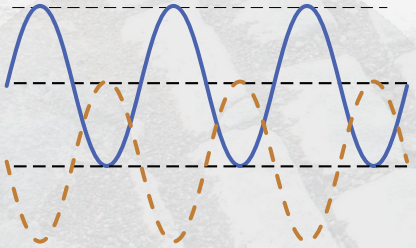
Sinusoid – Wave Form – Phase Difference CC-BY Dr. Chris Geoscience (2015)

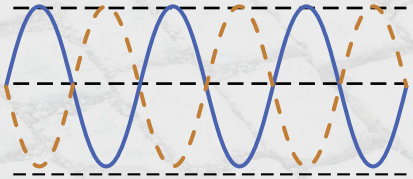
# Pathologies, where yin and yang are not in diachrony, may be diagnosed as one of four conditions (that change during the day)

**Excess yang ~**
**Normal yin**
**(Full heat)**



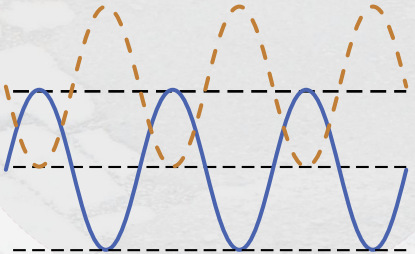
**Normal yang ~**
**Consumed yin**
**(Empty heat)**



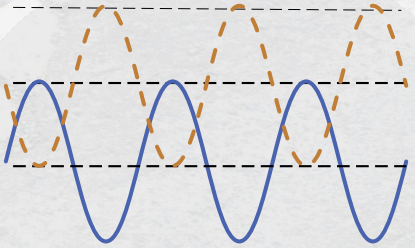


**Yinyang dyad**
**within normal range**

**Excess yin ~**
**Normal yang**
**(Full cold)**



**Normal yin ~**
**Consumed yang**
**(Empty cold)**



# Agenda

| | |
|---|---|
| A. | History of STS ↔ SES |
| B. | Case Studies:<br>Open Sourcing while Private Sourcing |
| C. | Root Metaphor Theory |
| D. | (Con)textural Dyadic Thinking for STS + SES |
| E. | Reifying → Implications:<br>Philosophical, Theoretical, Practical |

# Reifying root metaphors: ↓ rearranging objects, ↑ repacing rhythms

***Reifying philosophy***

↓ straight-lines + jumps

↑ rhythms + anticipation

***Reifying theory***

↓ reduction down to one

↑ threads co-responding

***Reifying practice***

↓ unfreeze-move-refreeze,

↑ (con)textural dyadic rhythmic learning


Spontaneous Synchronization, by University of Michigan Demo Lab (2022)

Cai Rang Floating Market, Mekong Delta, Vietnam by Elisabeth Frette (2020)

# Implications of systems changes: ↑ living systems, ↓ machines

| ***Philosophical*** | ***Theoretical*** | ***Practical*** |
|---|---|---|
| ↑ when+where; | ↑ kairotic rhythms + dyadic diachrony + situational propensity, | ↑ doing no harm, |
| ↓ what+why | ↓ future state ← current state | ↓ bias for action |

When Time Stands Still – Replacing Clock Movements by BaldGuyDIY (2020)

Plant Coming Back to Life by Storm Chasing Video (2018)

# When systems changes predominate,
# ↓ (SES function → STS structure),
# ↑ (SES+STS process → behaviour)

BMW Z4 GT3 - Car Assembly HD Time Lapse
by TeamWestCoatRacing (2010)

Friday Night Swing @ MUB 2017-02-03 CC-BY Gainesville Swing (2017)

# Creative Systemic Research Platform Institute

is an institution aiming to promote research and development of non-profit projects. We focus on investigating the skills needed for Community Resilience, supported by ecological practices and systemic and creative learning.

Existing since 2017 as a non-profit research group, we evolved in December 2020 into the CSRP Institute.

More about

Contact us

Image CC-BY Mike Cassano (2009) *Most Interesting Pothole*