Embodiment and synchrony as fundamental ingredients of psychotherapy

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Goals

★ Gestalt therapy concerns holistic Gestalt patterns: Self-organization & synchrony
★ Gestalt therapy incorporates the body: Embodiment
★ Gestalt therapy is interpersonal: Embodied communication, synchrony
★ Gestalt therapy has a research deficit and lacks a third-person perspective: That can be changed
**Bidirectionality**

not only: mental states are *expressed* through the body ('body language': gait, gesture, facial expression, prosody, posture)

but also: body states and actions shape the mind (the mind as expression of the body)

= embodied cognition

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**Bidirectionality = Circular causality**

the (embodied) mind has an *impact on* the social environment (through behavior)

but also: the environment *embeds* the embodied mind

= embodied communication
= intercorporéité

Storch & Tschacher (2014)
*Embodied Communication*. Hogrefe
Circular causality is just saying: do not disregard the body when studying cognition and social interaction.

In terms of systems theory...

The mind embedded in several layers

= a multi-level complex dynamical system.

If driven by external forces – free energy (Friston), affordances (Gibson), control parameters (Haken) – such systems display self-organization, e.g. synchrony!
Synchrony is significant in many social interactions.

H. sapiens with social affordances present

This is true also for psychotherapy.
let's quantify this – which data to compute nonverbal synchrony?

- body movement – video analysis / MEA
- body movement – actigraphy, sensors, kinect
- peripheral physiology – EDA, HRV
- brain physiology – NIRS
- this is objective science (not constructivism)

How compute dyadic nonverbal synchrony?

crosscorrelation function CCF – time domain

timeseries A
timeseries B
Nonverbal synchrony: the MEA + SuSy method

Ramseyer & Tschacher (2010) Nonverbal synchrony or random coincidence? How to tell the difference
Tschacher (1997) Prozessgestalten

Motion Energy Analysis (MEA)

Step A: Number of pixel changes from frame to frame of the video → two times series
**Surrogate Synchrony (SuSy)**

**Step B**: compute cross-correlations (CCF)

CCF on the basis of the two time series generated by MEA

Crosscorrelation function CCF
**Step B**: compute segment-wise CCF

Compute CCF in all segments of the video. Aggregate all CCFs on the basis of absolute Fisher's Z.

Segment-size may be 30s or 60s.

Aggregation yields a grandmean $Z = \text{"real synchrony"}$
**Step C:** generate pseudo-synchronies as controls (segment-shuffling)

**Step D:** Compare real synchrony (red graph) to pseudo-synchronies (100 other graphs)

**Step E:** Output for nonverbal synchrony: effectsize or grandmean $Z$; duration

Crosscorrelation function CCF
Study A: Nonverbal synchrony in psychotherapy

Ramseyer & Tschacher (2011). *Journal of Consulting and Clinical Psychology*

Therapies

70 outpatients, 104 therapy sessions early/late in therapy course, 15 min chunks from sessions
representative random sample of a database of >300 patients
34% anxiety disorders, 29% affective disorders, 11% adjustment disorder, 9% personality disorders, 17% other
CBT: Grawe's 'general psychotherapy'
**Study goals**

★ Synchrony of therapist and patient: does it exist?
★ Is it a marker of therapeutic alliance?
★ Synchrony linked with therapy process?
★ Synchrony linked with therapy outcome?

**Basic finding:** Synchrony (red) significantly higher than pseudo-synchronies (100 other graphs)

Effect size: $d = 0.50 - 0.59$

Time lag

Window of synchrony

Crosscorrelation function CCF
synchrony related to therapy process

Synchrony positively associated with
• therapeutic alliance
• patients' secure attachment (AAQ)
• patients' self-efficacy (GSE)

Synchrony negatively associated with
• patients' interactional problems, esp. 'cold', 'avoidant' (IIP)

synchrony related to therapy outcome

Synchrony predictive of
• post-treatment self-efficacy (GSE)
• symptom reduction (effect size BSI, effect size IIP)
Following and leading

- no significant difference across all data
- more therapists' leading in T1 (initial phase)
- more patients' leading in T3
- anxiety disorders: less therapists' leading
- patients' leading correlated with patients' self-efficacy

Study B: Nonverbal synchrony of schizophrenia patients

Kupper, Ramseyer, ... & Tschacher (2010). Schizophrenia Research
Kupper, Ramseyer, ... & Tschacher (2015). PLoS one
Sample & method

27 Sz patients with 14 recorded role-play interactions each (i.e. 378 videos)

- recorded in earlier research on vocational rehabilitation, re-analyzed with MEA. Interactants unaware of study goals.

- PANSS symptom ratings

MEA
region of interest: head
Results

- Synchrony effect size: $d = 0.7$; no sex difference
- Patients' amount of movement associated with psychopathology
- Nonverbal synchrony (pt-therapist dyads) associated with psychopathology:

Results (correlations)

<table>
<thead>
<tr>
<th>PANSS Symptom factors</th>
<th>Patients' head movement</th>
<th>head movement synchrony</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative factor</td>
<td>-.51 **</td>
<td>-.42 *</td>
</tr>
<tr>
<td>Positive factor</td>
<td>.11</td>
<td>-.29</td>
</tr>
<tr>
<td>Cognitive factor</td>
<td>-.07</td>
<td>-.46 *</td>
</tr>
<tr>
<td>Excitement factor</td>
<td>-.32 †</td>
<td>-.21</td>
</tr>
<tr>
<td>Depression factor</td>
<td>-.31</td>
<td>-.43 *</td>
</tr>
<tr>
<td>PANSS total</td>
<td>-.37 †</td>
<td>-.53 *</td>
</tr>
</tbody>
</table>

- more symptoms: less synchrony with interaction partner
Results asymmetric synchrony:

<table>
<thead>
<tr>
<th>PANSS Symptom factors</th>
<th>head movement synchrony (Patient follows)</th>
<th>head movement synchrony (Patient leads)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative factor</td>
<td>-0.46 *</td>
<td>-0.26</td>
</tr>
<tr>
<td>Positive factor</td>
<td>-0.13</td>
<td>-0.47 *</td>
</tr>
<tr>
<td>Cognitive factor</td>
<td>-0.35 †</td>
<td>-0.38 *</td>
</tr>
<tr>
<td>Excitement factor</td>
<td>-0.13</td>
<td>-0.25</td>
</tr>
<tr>
<td>Depression factor</td>
<td>-0.48 *</td>
<td>-0.36 †</td>
</tr>
<tr>
<td>PANSS total</td>
<td>-0.49 **</td>
<td>-0.46 *</td>
</tr>
<tr>
<td>social skills (DAS global)</td>
<td>0.09</td>
<td>0.53 *</td>
</tr>
</tbody>
</table>

Negative and emotional symptoms: Patient resonates less. Positive and disorganized symptoms: Patient was followed less! Social skills linked to patient's leading.
Discussion

- synchrony problems = a pivotal aspect of schizophrenia patients' reduced "social cognition"
- a basis of psychiatry folklore "Präcox-Gefühl"?

Study C. Nonverbal synchrony in dialogical interaction (healthy persons)

Tschacher, Rees, & Ramseyer (2014). Nonverbal synchrony and affect in dyadic interactions. *Frontiers in Psychology*
our social-synchrony lab

experimental design

- nonverbal synchrony (MEA) in unacquainted dyads

Conditions: cooperation, competition, fun task

168 participants (27.3 y., 84 unaquainted same-sex dyads)
synchrony clearly higher than surrogate control (Cohen's $d$: 0.56 - 1.11)

synchrony significantly related to positive and negative affect of the interacting persons, rated after each task

Synchrony = dependent variable
Participant = random effect

PANAS positive:  $t=3.79$, $p=0.0002^*$
PANAS negative:  $t=-2.72$, $p=0.007^*$
sex [M]:  $t=1.92$, $p=0.05$
Study D: Accelerometer analysis of a psychotherapy course


Sample & method

27 sessions (40 minutes each) of a psychotherapy dyad

- time series of movement activity monitored by accelerometers on both persons' wrists

- post-session measures:
  - ratings of ...therapeutic alliance
    ...progress
    ...well-being
    ...good collaboration
  - session #
Results

synchrony was significantly present, duration 6s

Results

synchrony associated with several measures:

- ratings of *therapeutic alliance*
  - progress
  - well-being
  - good collaboration

- session #

Thus, synchrony increases in the course of therapy, and is linked with alliance quality

replication of MEA findings by accelerometric recordings
Study E: Assessment of 'nowness' based on synchrony

Assumption: duration of synchrony = nowness = social present

Tschacher, Ramseyer & Koole (2017) Sharing the now in the social present. *Journal of Personality*

Tschacher, Ramseyer & Bergomi (2013). The subjective present and its modulation in clinical contexts. *Timing & Time Perception*
example: Dyad 3, fun task

![Graph showing nowness]

nowness \( \approx 4.5 \text{ s} \)

Sample (84 healthy dyads)

![Histogram showing seconds]

mean nowness (social present): 6.0 s (SD 1.95)
female dyads have shorter nowness

Mixed models regression of sex on nowness: $F(1,82)=3.99^*$

competition $\rightarrow$ extended nowness; time is shorter when you have fun

Mixed models regression of task on nowness: $F(2,333)=5.89^{**}$
**Further correlates of nowness**

extended nowness when...

- **Open to new experiences** (Big 5 questionnaire)
- Avoidant attachment
- Conversation rated "not constructive"
- Less narcissistic/self-centered personality

**Synchrony effect sizes (in Bern):**

**Psychotherapy:**
- Head synchrony: $d=0.74$
- Torso synchrony: $d=0.20$
- Hands, accelerometric: $d=0.48$

**Healthy dyads:**
- $d=0.56$ (cooperation)
- $d=0.76$ (competition)
- $d=1.11$ (fun task)
- $d=0.83$ (head)
- $d=0.67$ (torso)
- $d=0.67$ (feet)

**Schizophrenia patients:**
- $d=0.70$ (head)
Synchrony effect sizes (other groups):

**Dialogical family therapy** (J. Seikkula, Jyväskylä):
- $d=1.22$ (skin conductance)
- $d=1.00$ (MEA)
- $d=0.15$ (breathing)

**Couple conversations** (J. Coutinho, Braga):
- $d=0.11 - 1.14$ (skin conductance: neutral, neg, pos)

**Psychotherapy** (W. Lutz, J. Dittmann, Trier):
- MEA, body synchrony: $d=1.65$

**Dyads** (Lozza, la Marca, Elbert, Zürich):
- $d=1.33$ (MEA, competitive)

**Autism** (Vogeley, Georgescu, Köln):
- $d=0.60$ (MEA, head, ASD<mixed<controls)

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**Overall conclusions**

- ★ nonverbal synchrony associated with core factors of psychotherapy (alliance, self-efficacy, outcome)
- ★ nonverbal synchrony associated with psychopathology
- ★ nonverbal synchrony associated with affect in dialogical interaction
Applications?

★ efficient psychotherapists track several aspects of embodiment closely
★ a field open for generalizing research (nonverbal synchrony)
★ ...and for therapist training
★ the danger, however, is to become non-authentic:

Dittmann et al. (submitted) Nonverbal Synchrony: A new approach to understand psychotherapeutic processes and drop-out
Methodological discussion

★ self-organization & synchrony: objective phenomena in open complex systems

★ systems theory and synergetics: structural theories, i.e. neutral with respect to mind vs. matter

★ my principle: do objective research first, aim for generalization, meaning-making may ensue

★ Gestalt therapy: don‘t be afraid of ‚positivism‘

How is Gestalt therapy connected to today‘s research?

★ Gestalt therapy has a traditional link to embodiment (techniques like chair work)

★ Gestalt theory is consistent with nonlinear systems and self-organization theory; both describe holistic, emergent processes

★ Gestalt therapy focusses on the here-and-now: nowness of synchrony may serve as a marker of therapeutic presence
Thank you for your synchronization!

projects together with: Fabian Ramseyer, Claudia Bergomi, Zeno Kupper

get MEA.app: www.psync.ch

Announcement: