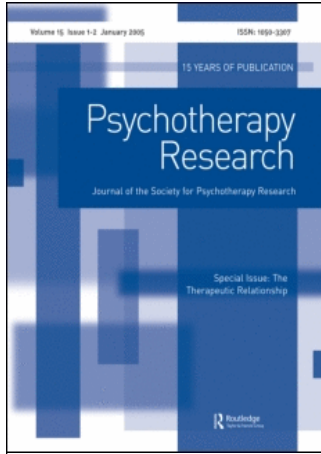


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### Resonating minds: A school-independent theoretical conception and its empirical application to psychotherapeutic processes

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## PRESIDENTIAL ADDRESS

## Resonating minds: A school-independent theoretical conception and its empirical application to psychotherapeutic processes

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The resonating minds theory will be introduced as a means to describe psychotherapeutic processes and change. It builds on the mind-brain interface with psychotherapeutic interventions causing change in the brain, an altered brain causes changes in the emotional, cognitive, and behavioral regulation, and this again will change the types of subsequent therapeutic interventions. For the empirical assessment of this theory the therapeutic cycles model will be used. It is based on computer assisted analysis of verbatim transcripts using emotional tone, abstraction and narrative style as language measures. Sample applications and studies are shortly presented in order to provide evidence for the applicability and face validity of this approach.

Psychotherapy works. This has been demonstrated by a number of authors focusing on outcome research (most recently Joyce, Wolfaardt, Sribney, & Aylwin, 2006; Ogrodniczuk, 2006). Psychotherapy is superior to the absence of treatment, with recovery and improvement rates of about 60% and 65%, respectively, if no distinction is made between therapeutic orientation and diagnostic groups and with a 5% to 10% patient deterioration rate (Lambert, 2007). Nevertheless, the exact mechanisms of change are still not known. To learn more about this psychotherapy process, research is needed. This article introduces a theory and the corresponding model for its empirical assessment with computer-assisted text analysis, developed over the last 20 years, that maps the therapeutic process and enables the process researcher to identify clinical processes and significant clinical events, to analyze them in detail, and to relate them to concepts stemming from neuroscience, experimental, and cognitive psychology. A critical overview of studies that provide first evidence and steps of validation for both theory and model concludes the article.

**The Resonating Minds Theory**

A target of process research is the investigation of the mind, both the patient's and the therapist's. To observe what they are doing with words, the single steps of meaning making in the therapeutic talk have to be understood in order to learn about the conditions that lead to therapeutic change. They communicate and interact in specific ways, a process I call the "resonating mind," and differentiate two aspects. First, the interpersonal view is found in concepts like therapeutic alliance, or the pathways of emotional communication (Bucci, 2001). On a more biological level is the discovery of the mirror neurons that Rizzolatti, Fogassi, and Gallese (2001) identified as neurophysiological mechanisms underlying the understanding and imitation of action as well as experiences (Saarela et al., 2007). Second, the intrapersonal view is found in concepts regarding the flow of information within a person's mind (e.g., in Horowitz's, 1987, theory of "states of mind") or, seen from a neurobiological view, activities between specific brain areas and between the hemispheres, marked by the asymmetry of the brain (Hugdahl &

Davidson, 2003). Psychotherapy process research is concerned with both aspects, keeping in mind how each of them will contribute to therapeutic change. The resonating minds theory (RMT) takes up these perspectives and extends them to the interactive system between therapist interventions and the modalities of patients' behavior. The key concepts that are being used in RMT are therapeutic process and change, brain asymmetry, cognition and emotion, and therapeutic interventions understood as triggering different mental states or brain activities in the patient. They are described in more detail next.

### Therapeutic Process and Change

When talking about therapeutic change, it is important to clarify what is meant. The RMT distinguishes three factors: affective experiencing, cognitive mastery, and behavior. All these factors are at work all the time. They are brought into the therapeutic situation by means of talking about experiences, by reflecting on them, and by telling stories that reflect real behavior. Therapeutic change thus can be understood as a change from a pathological toward a normal regulation of emotional, cognitive, and behavioral processes. The psychotherapeutic process can be seen as a set of verbal, psychotropic, or other therapeutic interventions that directly influence a patient's emotional, cognitive, and behavioral regulation. Therapeutic interventions are sought by therapists in such a way that gradually a pathological system of regulation will turn into a more adaptive one.

Psychotherapy research has followed this understanding for a long time. However, from a more current point of view, an important link is missing: the neurobiological level or, more precisely, the brain. Whatever is done on the level of interventions, it will first reach the brain, alter the state of the brain or specific areas of it, and only then, as a consequence of the changes in the brain, will the emotional, cognitive, and behavioral regulation change. For a better understanding of the psychotherapeutic process, it is helpful to take into account the functioning and change processes in the human brain in order to understand and explain psychotherapeutic change. In the case of medication as a major therapeutic intervention, this always seemed to be quite apparent, because it is obvious that the drug will alter the chemistry of the brain and, consequently, a patient's experiences. With regard to verbal interactions, in the brain change does not seem to be that evident.

That psychotherapy changes the brain no longer may be seen as an unsupported claim. One of the earlier studies that provided evidence for this was by

Brody et al. (2001), who reported on regional brain metabolic changes in patients with major depression treated with either paroxetine or interpersonal therapy. Both groups showed decreased activity in the prefrontal cortex. Patients on medication showed the decrease in both hemispheres, whereas those who received verbal treatment only changed in the right hemisphere. Roffman, Marci, Glick, Dougherty, and Rauch (2005) gave an informative overview on neuroimaging findings and concluded that psychotherapy and pharmacotherapy yield similar but not identical changes in the regional cerebral blood flow. The fact that these changes are not identical is not surprising. Psychotropic drugs essentially either inhibit or activate major brain areas in a mostly unspecific way. Words can activate or inhibit many and even small brain areas, and groups of words like sentences or thought streams can do this in even more specific ways (Posner & Raichle, 1994). However, the mechanisms of change involved with the usage of speech in psychotherapy have not been identified so far. The RMT is supposed to bridge this gap to provide a theoretical conception that allows the development of methodological approaches to empirically assess and validate its assumptions.

I contend that psychotherapy process research needs to integrate mind, brain, and therapeutic interactions, to link aspects of emotional, cognitive, and behavioral regulation with neurobiology and with various types of interventions. To open the door toward an understanding of therapeutic change this way, the question remains, What are the specifics of "psycho"-therapy? It is effective, causes changes in the brain, and can be done with a variety of therapeutic interventions that obviously dispose of the capacity to specifically contribute to change. Can these characteristics be identified?

### Evidence From Neuroscience

During the past few years, an increasing number of findings in neuroscience have emerged that might be related to one or more characteristics of psychotherapeutic interventions. I refer to two examples to give an idea of how the process of linking findings from brain imaging with types of therapeutic activity such as patient narrative and therapist interventions could work.

The first example is a functional magnetic resonance imaging study by Yomogida et al. (2004) that shows the effect of watching concrete stationary objects and imagining that they move, like an internal movie. The participants were asked to look at drawings of a ladder and a cat. They then were instructed to imagine how these two objects might

interact (e.g., the cat climbs up the ladder). This task caused a strong activation, specifically in the left hemisphere. I conclude that similar activations take place when a patient reports a dream. This assumption is supported by other findings regarding concrete versus abstract words, with concrete words being processed in the left brain (e.g., Perani et al., 1999). To put it concisely, I am suggesting that all kinds of interventions that evoke an internal imagery or cause a narrative report are likely to activate the left hemisphere.

The second study focused on participants' attention to visual speech gestures while observing a female face silently articulating vowels (Pekkola et al., 2006). The instructions required the participants to direct their attention either to the phonetic content of the sounds they thought were being articulated or to the direction of movement of elliptic circles that were projected over the mouth area, as a nonverbal visual stimulus. This task enhanced activity in the left planum temporale for the articulation discrimination compared with the nonspeech motion discrimination task. This could mean that, in face-to-face settings, it may be interesting to pay attention to moments in which patients avoid gazing or eye-to-eye contact and thus avoid possible left hemispheric activation.

However, therapeutic interventions focus not only on the left hemisphere. Rhythmic movements of the legs, for example, cause activity in the right brain, whereas listening to music activates both hemispheres (Brown, Martinez, & Parsons, 2006).

These and the many other studies suggest that there is ample evidence for a lateralization of cognitive skills (Hugdahl & Davidson, 2003). This certainly will be of relevance for clinical practice. It even seems to be a natural consequence that therapeutic interventions and certain types of verbal activities have the potential to contribute to the asymmetric activation of the brain or to undo a strong asymmetric activation.

Along with this, two additional principles, activation spreading and neural plasticity, (McClelland, Rumelhardt, & the PDP Research Group, 1986) are useful.

*Activation spreading.* This means that areas in the brain that are neighboring or reside in the same hemisphere of an active area are more likely to become active themselves. It is important to use the phrase "more likely" because it is not a law that it has to be; it is just an increased likelihood, and it may need some additional input to really make such an area active. Thus, activating an internal imagery, like when telling a dream, may be the cause for a subsequent increase of positive emotion, because

both phenomena are assumed to be predominantly processed in the left hemisphere (see later discussion of lateralization of emotion). This may even be true in the case of a nightmare, because it is possible to activate areas in both hemispheres and, later, to experience both positive and negative affect at a time (Russell & Carroll, 1999). However, because of either some pathological information processing or a possibly counterproductive intervention or other reasons, an activation of positive emotions also may become blocked despite the processing of the imagery in the left brain when reporting the dream.

*Neural plasticity.* This concept basically explains why a brain undergoes functional and structural alterations in response to external and internal environmental changes (May et al., 2007) and why it persists (Wang, 2003).

The question remains whether there are more or less favorable constellations in brain activity with regard to cognitive skills necessary in psychotherapy to bring about change and good outcome. To find answers, experimental psychology might be of help.

## Evidence From Experimental Psychology

*Broadening.* Isen, in the late 1980s, did some pioneering work relating specific cognitive skills with the valence of emotion. She convincingly demonstrated that positive emotions widen the array of the thoughts and actions that come to mind and in this way support or even enable creative or problem-solving processes (Isen, Daubmann, & Nowicki, 1987). Fredrickson (1998) further developed the notion that positive emotions "broaden and build." *Broadening*, as she labeled this process, is found to be an important aspect of the psychotherapeutic process: Patients need to focus on emotion-relevant domains but have to be generative of, or receptive to, a wide range of ideas and actions that may come into mind and may help to undergo change as, for example, through some new insight. Two questions remain: What might the negative emotions be good or helpful for? Is there a complementary function of "narrowing," as Rathunde (2000) proposes?

*Deepening.* Again from the work of Isen (1990) stems the concept that negative emotions focus our cognitive organization. I conclude from this that negative emotions provide or prepare pathways to relationship episodes, autobiographical material, and closely related topics. Analogous to Fredrickson's "broaden-and-build," I labeled this state "deepen-and-provide." Participants "with negative emotions are more focused on the seeking and use of information" (Spering, Wagener, & Funke, 2005).

Patients in a state of *deepening* typically retrieve conflict-related material to be worked through in the psychotherapeutic process. This fits well with the clinical observation that patients typically present their problems with negative emotions and report a higher preponderance of negative relationship episodes during therapy. How does this relate to the brain, to neural networks that may be involved? Taking up the thread of brain asymmetry and concentrating on the three change factors mentioned previously, emotion might be a good candidate for investigating this.

### Lateralization of Emotion

Davidson (1993) presented three alternatives: (a) that emotions are located in the right hemisphere; (b) that emotions associated with approach are located in the left hemisphere, whereas emotions associated with withdrawal are located in the right hemisphere; and (c) that positive emotions are located in the left hemisphere and negative emotions in the right hemisphere (valence hypothesis). More recently, additional perspectives about the lateralization of emotions have emerged (Wirth, 1998; Olko, 2002). There is limited support for the valence hypothesis, with negative emotions on the right and positive emotions more likely on the left and with males showing more lateralization to emotional activity (Wagner, Phan, Liberzon, & Taylor, 2003). To conduct empirical research, it is important to make assumptions. The RMT follows the valence hypothesis, and I base my further reasoning on these assumptions. The implications of the approach/withdrawal hypothesis are discussed later.

Returning to the concepts of broadening and deepening from experimental psychology, as well as from neuroscience, there is some evidence that the deepen-and-provide notion is supported by studies that located negative autobiographical memories in the right hemisphere (Fink et al., 1996; Piefke, Weiss, Zilles, Markowitsch, & Fink, 2003) and found right brain activity during recall of traumatic memories (Schiffer, Teicher, & Papanicolaou, 1995).

Another concept central to cognition is deductive and probabilistic reasoning. There is some evidence for distinct right and left brain systems for deductive versus probabilistic "Aha!" types of reasoning (Kounios et al., 2006; Parsons & Osherson, 2001). Thus, negative emotions, deepen-and-provide states, as well as deductive reasoning tend to be processed in the right brain, whereas positive emotions, broaden-and-build states, and probabilistic reasoning tend to be processed in the left brain.

*Shift events.* In my view, both deepening and broadening are essential in therapy. Ideally, deepening should be followed by broadening as a sign of working through conflictive material that has been provided. Shift events are supposed to achieve such a transition from a state of deepen-and-provide to one of broaden-and-build. They can be triggered by either the therapist or the patient. Typical shift events occur during narratives, dream reports, chair work, empathic responses, systemic evocative unfolding, and more. Shift events may be shared or specific for different therapeutic orientations.

### Summary

The RMT is built on the principles and concepts just presented. The therapist–patient interaction is marked by resonating processes that include affective experiencing, cognitive mastery, and behavioral regulation. Therapeutic interventions are key to RMT. They explicitly trigger brain areas by asking for activities that, as an immediate consequence, activate specific areas. They also may trigger brain areas implicitly by providing cues that will be processed in specific areas and, based on the mechanism of activation spreading, tend to activate the same and neighboring areas. In the therapeutic process, deepen-and-provide has the function of problem activation, whereas broaden-and-build accounts for problem solving. It is assumed that in existing psychotherapies, therapists and patients "resonate" in such a way that a problem will be activated and then problem solving will follow. Given the asymmetry of the brain and the assumed lateralization of emotions, interventions will be chosen in such a way that right hemisphere activation will be followed by left hemisphere activation, both steps either explicitly or implicitly. In the following section, this theoretical conception is applied to a viable method for the empirical assessment of the RMT principles.

### The Therapeutic Cycles Model

The therapeutic cycles model (TCM) may be seen as an instantiation of the RMT as a means for empirical research. It views the therapeutic process from a linguistic perspective because it can be observed within psychotherapy transcripts and other related textual data, making the assumption that the three factors distinguished by the RMT—*affective experiencing*, *cognitive mastery*, and *behavior*—will be represented at the level of the discourse. The corresponding linguistic measures used by the TCM are emotional tone, abstraction, and narrative style. It relies on computer-assisted content analysis

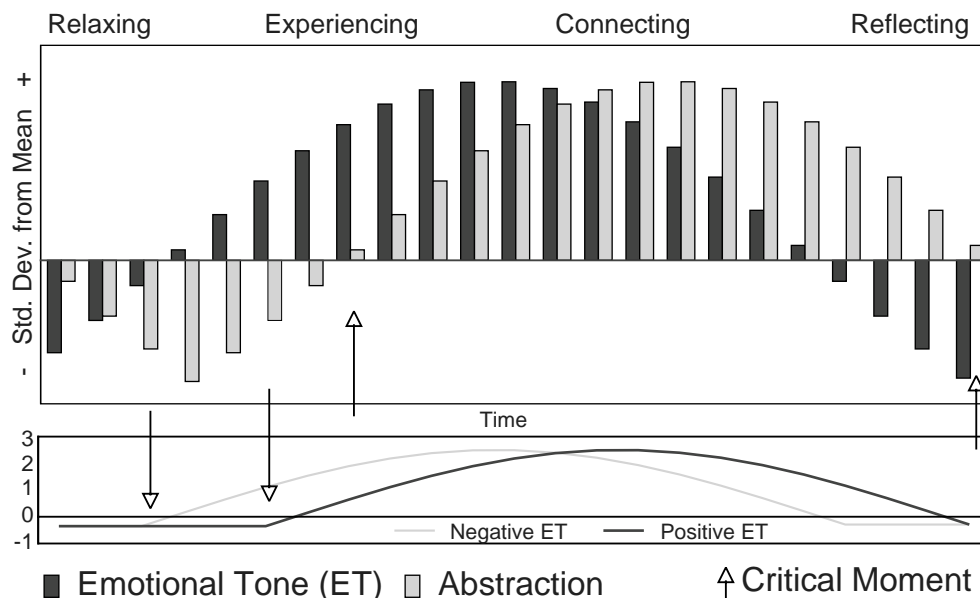


Figure 1. The therapeutic cycles model. Variation of linguistic measures around the mean and across time represent one prototypical cycle.

that is based on dictionaries of words identified as markers for affective language (emotional tone; Mergenthaler, 1996), for conceptual language (abstraction; Mergenthaler, 1996), and for storytelling and narration (narrative style, a dictionary that is closely related to the development of the computer-assisted measurement of referential activity; Mergenthaler & Bucci, 1999).

In its earlier version (Mergenthaler, 1996), the TCM was composed of its main elements, emotional tone and abstraction, and their temporal variation was assumed to follow a curve ideally resonating like the sine (Figure 1, upper graph). There was no rationale available for predicting which of the two variables might increase first and why these variables might behave in a cyclical manner at all, except for anecdotal evidence and support from everyday experience that no healthy person likes to or even can remain in a high (or low) level of arousal or abstract thought for an extended period of time: *variatio delectat* (variation pleases). It also was assumed that there is a time lag between emotion tone and abstraction. The current version is an extension of the previous one and additionally differentiates the valence of emotional tone. It is now grounded on the RMT by reflecting that negative emotion and deepening will occur first, followed by an increase of positive emotion and broadening, which then leads to connecting. In Figure 1, this is represented in the lower graph showing an idealized flow of positive and negative emotional tone across the time. Both upper and lower graphs together represent the TCM.

The flow of variables as shown in Figure 1 represents one prototypical cycle. It is theoretically

derived and represents an idealized flow. The left and right ends of the graphs mark the beginning and end of the prototypical cycle. The observation unit can be a therapy session, referred to as microanalysis later, with segments like word blocks. (Other segmentation criteria like turn of speech or time segments are possible as well.) On a macroanalytical level (for more details, see Mergenthaler, 1996), the model may be applied across sessions describing complete treatments. For the sake of clarity, all further descriptions and examples within this section of the article relate to microanalyses on a within-session level. The cycle is not expected to occur frequently or repeatedly within a session or even in every session. A good therapy, however, following the RMT will be marked by an increasing number of successfully passed cycles. Patients who do not succeed in connecting emotion tone with abstraction during their therapy are likely not to improve.

### Emotion–Abstraction Patterns

The quantitative dimension of emotion tone and abstraction allows the differentiation of at least four classes that are henceforth referred to as emotion–abstraction patterns. Graphically they are represented as a combination of the  $z$ -scored relative frequencies for emotional tone and abstraction words (see Figure 1). The four patterns are labeled and interpreted as follows. Some evidence for the interpretation of these patterns is presented, along with the studies, in the second part of this section and in the discussion of the empirical evidence of the TCM.

1. *Relaxing*: little emotional tone (equal to or below the mean) and little abstraction (first three bars in Figure 1). Patients talk about material that is not manifestly connected to their central symptoms or issues. They describe rather than reflect. Further, it is a state to which patients return as often as they feel the need, thus regenerating both physically and mentally to prepare themselves for the next step of their "talking cure."
2. *Experiencing*: much emotional tone and little abstraction (Bars 4–7 in Figure 1). Patients find themselves in a state of emotional experiencing. Patients may be raising conflictual themes and experience them emotionally. With regard to the valence of emotion, positive and negative experiencing additionally will be differentiated depending on whether positive or negative emotional tone is dominating and above the mean.
3. *Connecting*: much emotional tone and much abstraction (the middle bars in Figure 1). Patients have found emotional access to conflictive themes and they can reflect on them. This state marks a clinically important moment that often coincides with a moment of insight or possibly a moment of change.
4. *Reflecting*: little emotional tone and much (above the mean) abstraction (the last four bars in Figure 1). Patients discuss topics with a high amount of abstraction and without intervening emotions. This may be an expression of the defense known as *intellectualization*.

### Critical Moments

Returning to the graphic representation of the TCM (see Figure 1), four arrows have been inserted to mark what I call *critical moments*, where pathological behavior may differ from more normal ways of emotional, cognitive, and behavioral regulation. In the case of a problematic event, a healthy person might be expected to pass through the cycle, as shown in Figure 1, easily and perhaps quickly. However, this might depend on the nature of the event that causes the cycle to start. In the case of being confronted with bad news like the illness of a good friend, it may take longer, maybe an hour or even days, to go through the cycle. In the case of a small misfortune or daily hassle, like a slip of tongue, this is likely to be a very fast process, realizing the negative experience coming along with it, searching for an explanation, smiling or laughing, and resolving the problem. Patients, however, may experience considerable difficulties in proceeding past one, some, or all of these critical moments and need a

therapist to support them with appropriate interventions to successfully pass through a cycle. I describe these critical moments briefly and propose some interventions a therapist might use to assist the patient in proceeding to the next phase of the cycle. These critical moments are generalizations from typical patterns that have been found across lots of patients. The examples for interventions are drawn from real cases.

The first critical moment is when a patient has difficulties accessing conflictual material. Therapists typically initiate deepening. Examples might be to trigger negative feelings ("You seem sad today" or "What bothers you?"), to emphasize negative feelings ("Say that again, 'I hate my mother'" or "You are alone, abandoned, lost"), or to ask for a detailed symptom description, just to mention a few.

After a successful deepen-and-provide experience, the patient may be stuck in negative experiencing, the second critical moment, and the therapist may want to start broadening, a broaden-and-build phase, by initiating a shift event. Here the disparate therapeutic orientations may differ most. Some try to elicit a narrative: "Do you have a memory of this?" Others, for example, initiate empty- or two-chair work or propose homework. If a patient, despite the successful initiation of a shift event, cannot start to broaden-and-build, the therapist may try to foster a positive experiencing by taking up positive aspects that have been presented by the patient in his or her most recent statements. An example of this is the dream presented in the next section, in which a sexual topic was taken up. Very often in transcript analyses we found a specific "language tool," with the therapist expressing negative thoughts of the patient in positive terms:

Patient: "I hate her."

Therapist: "You don't love her any longer?"

Using a negation along with a positive term holds up the semantic meaning but causes the processing (resonating) of a positive aspect for the patient and, as a likely consequence, an activation shift toward the left brain. Also, use of humor may cause a shift toward broaden-and-build.

The third critical moment is marked by a lack of reflecting about feelings. Again, here we found a typical set of therapist interventions that may trigger and encourage the connecting process: "What does this mean to you?" or "What other ways could you think about this?"

Finally, if all these barriers are overcome, a new cycle may begin. This might happen, for example, by the therapist asking for more symptom-related

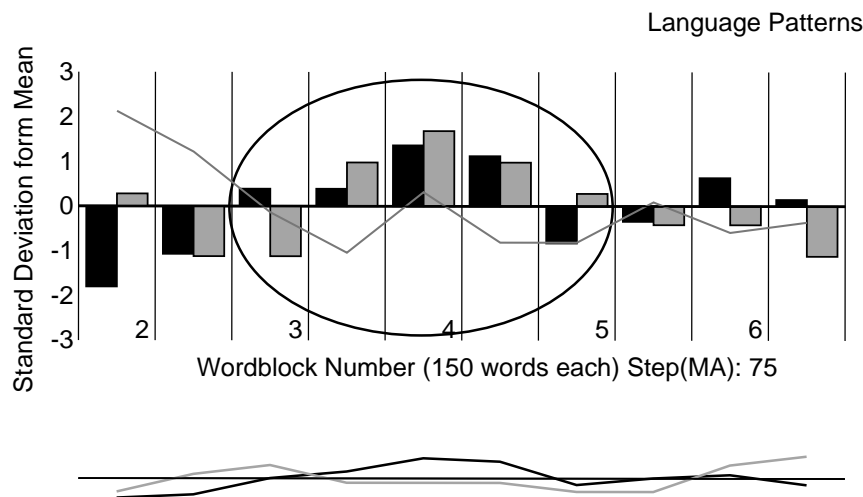


Figure 2. Top: Standardized flow of emotional tone (black bar) and abstraction (gray bar) in the Brothers Grimm fairy tale “Mother Hulda” segmented into word blocks and smoothed. MA =moving average using half word block size. The circle marks a cycle. Bottom: Standardized valence of emotional tone, positive (black line) and negative (gray line), varying around the mean.

information or by resuming reflection on feelings. Patients who in the course of a therapy do not learn to pass the critical moments and, therefore, to pass a cycle completely are less likely to improve.

The TCM and its application are not restricted to clinical material. Earlier testing of the model on different types of text demonstrated the presence of cycles. Figure 2 shows the application of the TCM to the Brothers Grimm fairy tale “Mother Hulda.” A cycle (marked with a circle in the graph; a definition is provided in the section on the TCM software) develops toward the middle of the story. The fairy tale ends with an emotionally heightened episode. A cycle is considered to represent a normal process of human experiencing and information processing.

### A Sample Clinical Illustration of the TCM

The following description is inspired by a real case (Amalia X., Session 152; Kächele et al., 2006) and presents in a condensed way the essentials of a psychoanalytic session to illustrate the temporal sequence of the phases of the model (see Figure 1) in a way clinicians might be more familiar with. An example with real data is shown later. The patient begins the session without really knowing what to start with, which in the model corresponds to relaxing (first three blocks, emotional tone and abstraction below the mean). Then, at the first critical moment, she turns to negative feelings, a negative experiencing (emotional tone above the mean, abstraction below the mean, and negative emotional tone above the mean), with the remark that she has not slept well, that she thought she might have a heart attack. Then she recalls a dream: She is lying on the floor, dead, with a knife in the

back, and her skirt far up, which was embarrassing because a former colleague passed by; a couple then came up to her and cut off her hair; finally she stands up and goes to see a hairdresser. The therapist responds to her being dead in a mode of “deepen-and-provide” by reflecting: “So you were dead; you had that knife in your back.” The patient reminds the therapist that, despite the knife in her back, she obviously was alive because she went to the hairdresser. This happens around the second critical moment and can be seen as a step toward positive experiencing (emotional tone above the mean, abstraction below the mean, and both negative and positive emotional tones above the mean). A “broaden-and-build” shift occurs near the third critical moment, when both the patient and the therapist refer to the sexual image regarding the patient’s skirt in the dream. This association then leads to a connecting event, an insight with regard to her shame (anxiety) and her relationship with the former colleague she saw in the dream. This is considered to be a moment of change, yielding a mini-outcome that was followed in the last phase of the model by some abstract thoughts without emotional ground, reflecting (emotional tone below the mean, abstraction above the mean). Another cycle may now begin.

### Using the TCM on Case Material

*The software.* Session transcripts are analyzed by the CM software.<sup>1</sup> CM takes as an input the text file of a transcript and produces as an output a graphic representation of the session (Figure 3). The session is segmented into word blocks of 150 words each and additionally the window moves in steps of 75



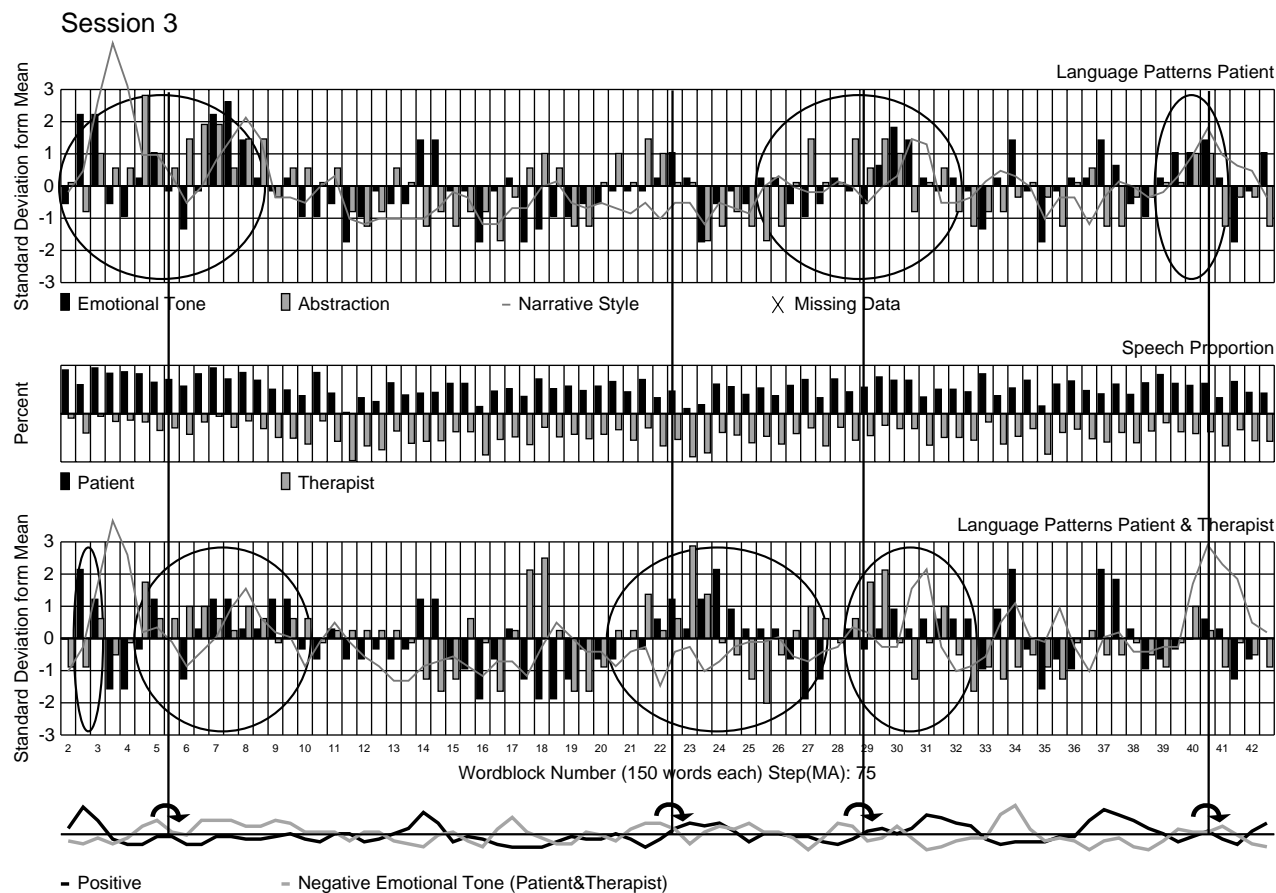


Figure 3. Sample graphic output from CM. Input was the transcript file for Session 3 of the case of Lisa (York I Depression Study, courtesy Dr. Les Greenberg). Circles mark instantiations of cycles (see text for definition); vertical bars and arrows point to shift events. MA = moving average using half word block size.

words, providing a finer grained representation of the flow. The black bars in the top and bottom graphs represent emotional tone, the gray bars abstraction. The second graph from the top shows the speech proportion: black and above the axis for the activity of the patient, gray and below the axis for the therapist. Both together represent 100%. To give an example, in the first block the patient has almost 100% of the speech, and before Block 12 the therapist has about 100%. The bottom graph displays the valence of emotion, with black representing positive emotion and gray representing negative emotion.

Patients as well as healthy people do not behave like the textbook says or a model prescribes; similarly, they do not perfectly follow the TCM. Thus, to apply the model and to work with empirical material, definitions are needed to translate the prototypical cycle into a real situation. A *cycle* for this purpose is defined as any sequence of emotion–abstraction patterns that includes at least one connecting block and is delimited by a relaxing block before and after. Where there is no relaxing word block before a connecting word block, the beginning of the session

will count as the beginning of the cycle. The same applies to that case at the end of a session. For a connecting word block to form the basis for a cycle, at least one of the two variables must be above 1 SD, and the other must reach at least 0.25 SD above the mean.

Optionally, as shown in Figure 3, the software generates a circle around the cycles present in the session based on the prior definition. The vertical lines and arrows in Figure 3 (not provided by CM but inserted manually in the graph) indicate shift events, moments in which positive emotion changes above the mean after a dominating negative period. These are expected to be moments when the necessary preconditions are given for connecting and thus insight or change to follow.

In addition to the graphic representation, CM also provides a data file for statistical analyses, a post-script file to reproduce the graph, a statistics summary, leftover lists with words in the text but not in the dictionaries, and more.

*The interpretation of a CM graph.* The CM graph may be used as a guide to the session. Typically, with

the prototypical cycle in mind, the therapist would locate one or a sequence of outstanding word blocks in the graph and then return to the transcript—the software also provides a version of the text file with word block markers—in order to have a closer look at the turn-by-turn discourse. Such moments could be instances of critical moments (e.g., positive experiencing has been reached but no connecting follows, as in Word Block 14 in Figure 3; CM output for Session 3 of the case of Lisa) or complete cycles, or differences between the patient's graph and the one for patient and therapist together (e.g., Word Block 23–25 in Figure 3 where obviously the therapist only contributed to connecting). The following example again refers to Figure 3, starting with Word Block 29, where a shift event can be observed that leads to a connecting in patient's language patterns in Word Block 30. The whole sequence is part of a cycle.

Start Word Block 29:

Therapist: How do you feel about him when you remember that absence?

Client: Um, maybe not wanting to be there.

T: It kind of hurts?

C: Yeah, um, I realize that ... it's, um, a disease thing, that can't be controlled.

T: Mm-hm.

C: Or emotions could have been part of why he couldn't express himself, or had such strong emotions that he escaped to that.

Therapist initiates two-chair work:

T: Uh – huh.///talking, can you switch over here?

C: Okay.

T: What are you saying to C.? You're saying that I couldn't control it, I had strong emotions?

C: Yes, you're right C., that was more of an escape for me, because to get out of reality ...

T: I needed to escape.

C: Yeah, it's like a high, it's almost like feeling high when, um, I got into the gambling and was away from the family and didn't have to face my problems [laugh].

Start Word Block 30:

T: I could, I could shut the world out this way.

C: Yeah.

T: Shut out the pain.

C: When really I should have been at home helping your mother out and, just being there with you kids.

T: Mm-hm, so that's like, I should have been there.

C: Yeah, I should have been there, helping mom out.

T: Mm-hm.

C: So she wouldn't be so, um, tired—or depressed, given her a break, if she wanted a little time away from you kids if she needed it.

T: And how did you feel? Why did you say that?

C: Um, angry, um, I'm sorry, sorry that I wasn't there and sorry that I didn't do anything about it.

T: Mm-hm.

C: I just thought I'd make money and come home and be able to pay the bills with it and everything else would be alright.

T: I thought that, my contribution was enough.

Start Word Block 31:

C: I thought I was—trying to support a family, and, and to me that was—what I had to do.

T: Uh–huh, and so I thought that that was good enough, is that what you're saying.

C: Yeah, under my, power and faith and belief, I thought that was what I should be doing.

End of chair work:

T: Uh–huh change. —How do you respond to that? He says that he thought that was good enough. What happens ...

C: Um, I'll feel relieved.

T: You feel relieved like a weight has lifted.

C: Just talking about it.

T: Uh-huh, can you tell him, 'I feel relieved to be able to tell you about this, these feelings'?

C: Yeah, I do. It feels really good to be able to say this to you, to let it out of me, I shouldn't have to [crying] carry these feelings.

T: Mm-hm.

C: It's really overwhelming.

T: Do you feel overwhelmed right now?

Start of Word Block 32:

C: Um, like uh ...

T: Kind of like a rush of all these feelings, is that it?

C: Yeah, yes [sniff].

In the prior example, we see that the therapist changes the setting to start two-chair work. The patient accepts, and in the graph for patient's language patterns we observe an increase of emotional tone while maintaining a high level of abstraction in the second half of Word Block 29 followed by connecting in Word Block 30. Then the language measures "relax" approaching their session mean and finally, starting with Word Block 32, falls below the mean, and relaxing can be observed.

### Empirical Evidence for the TCM

To provide empirical evidence for the underlying assumptions of the RMT and the findings with TCM, it will be necessary to conduct studies that focus on its specific aspects finally yielding a convergent validity. I briefly refer to a number of studies that may provide contributing evidence. In doing so, I follow Kazdin (2007), who suggested seven criteria or requirements that a theory with its proposed mediators and mechanisms of change needs to meet: strong association, specificity, consistency, experimental manipulation, time line, gradient, and plausibility or coherence. Using the TCM, connecting is understood as a mediator, a proxy for emotional and cognitive regulation, that, like a marker, points to moments when mechanisms of change are expected to be at work. The mechanism itself, following the RMT, is the integration, or "connection," of affective and cognitive processes

and the corresponding shifts in brain activity (that cannot be assessed directly with transcript analysis). The shift events may be found to be causes that lead to and are responsible for change.

### Overview

*Strong association.* We have accumulated some evidence suggesting significant correlations between the psychotherapeutic intervention and connecting and between connecting and therapeutic change (Nicolò, Mergenthaler, Pontalti, Semerari, & Catania, 2000; Fabi & Mergenthaler, 2004; Mergenthaler, 2003, 2004). The weakest aspect in our findings is that we have had access to outcome data after every session in only two cases (Kraemer, Lihl, & Mergenthaler, 2007). In the other studies, outcome was measured pre- and posttherapy, and hence we cannot conclude that connecting caused change. It might well be that first some change occurred and then, as a consequence, connecting appeared. More studies need to be conducted.

*Specificity.* The specificity of the association among the intervention, the mediator connecting, and outcome should ensure that only the connecting events account for change. In none of the studies done so far have patterns other than connecting been associated with outcome. With regard to therapist interventions, Walter (2007) has investigated the role of four types of therapeutic interventions on patient responses in terms of emotion-abstraction patterns, and found that challenge to facts resulted in a relaxing pattern, challenge to cognition resulted in a reflecting pattern, challenge to emotion resulted in an experiencing pattern, and challenge to integration of cognition and emotion resulted in a connecting pattern. This supports the specific function of each of the four patterns. Limberg (2008) took a closer look at therapist interventions before and after connecting events. He found that "encouraging patient to reflect" occurred significantly more often before connecting and "asking patient for facts" was significantly more frequent after connecting blocks.

A third study argues for the specificity of connecting as a mediator of change, and I present this in a bit more detail. A person may discuss the same topic or relationship pattern in different states of mind (Horowitz, 1987). The general categorizations for these states relate to emotional modulation, which is assessed by raters from a video recording. Four categories are distinguished by the degree of control the individual has over emotional expression: (a) well modulated (intact regulation), (b) overmodulated (stifled or overcontrolled), (c) undermodulated (loss of self-regulation), and (d) shimmering (rapid shifts

between overcontrolled and undercontrolled emotionality or discordant features of both). In a pilot study, Mergenthaler and Horowitz (1994) found that “therapeutic processing of conflictual topics is often accompanied by Shimmering State of Mind, which are associated with connecting and experiencing in the text analyses” (p. 392). In the study presented here (di Marino & Mergenthaler, 2003), an even more rigorous approach was taken by comparing states of mind that were rated from videotape without use of the sound track with emotion–abstraction patterns as derived from the transcript. In this way, the two data sets can be seen to be independent from each other, whereas in the pilot study the raters made use of the verbal exchange as well.

The patient was a 24-year-old student diagnosed with an anxiety disorder. He received systemic therapy with an experienced female therapist, for a total of 21 sessions lasting 60 to 90 min over the course of 1 year. Videotapes and verbatim transcripts were available for 17 sessions. Four sessions could not be evaluated because of technical difficulties. State of mind was rated by a trained rater using a rating manual (Ewert, Horowitz, & Milbrath, 1992). To assess reliability, two clinical judges independently rated every 30-s interval from the videotape, rating the single predominant state of mind as one of the four main categories. The interrater agreement (intraclass correlation [ $ICC_{21}$ ]) for rating all categories based on a random sample of 10 therapy sessions was between .83 and .85, indicating a good

level of reliability of the states of mind ratings. To compare states of mind ratings and emotion–abstraction patterns, three consecutive 30-s segments were collapsed to one 90-s segment and synchronized with word block boundaries (on average, 150 words).

Figure 4 shows the results of a correspondence analysis (Greenacre, 1993), a descriptive/exploratory technique designed to analyze simple two-way and multi-way tables containing some measure of correspondence between the rows and columns. If data rows have very similar profiles, their points in the correspondence analysis plot will be close to each other. This analysis demonstrates, as predicted, that well-modulated states correspond with relaxing, overmodulated states with reflecting, undermodulated states with experiencing, and rapid shifts between the latter two states, which Horowitz calls shimmering, with connecting. This finding suggests a strong relationship between different levels of communication. What is said is also expressed with gesture and mimicry. It also supports the notion that connecting is a moment of therapeutic change, as has been shown for the corresponding state of shimmering independently in Horowitz’s work (Horowitz, Ewert, & Milbrath, 1996)

*Consistency.* This is a requirement that concerns the replication of an observed result across studies, samples, and conditions. We have had the opportunity to apply the TCM to many different therapeutic orientations in individual therapy—client centered

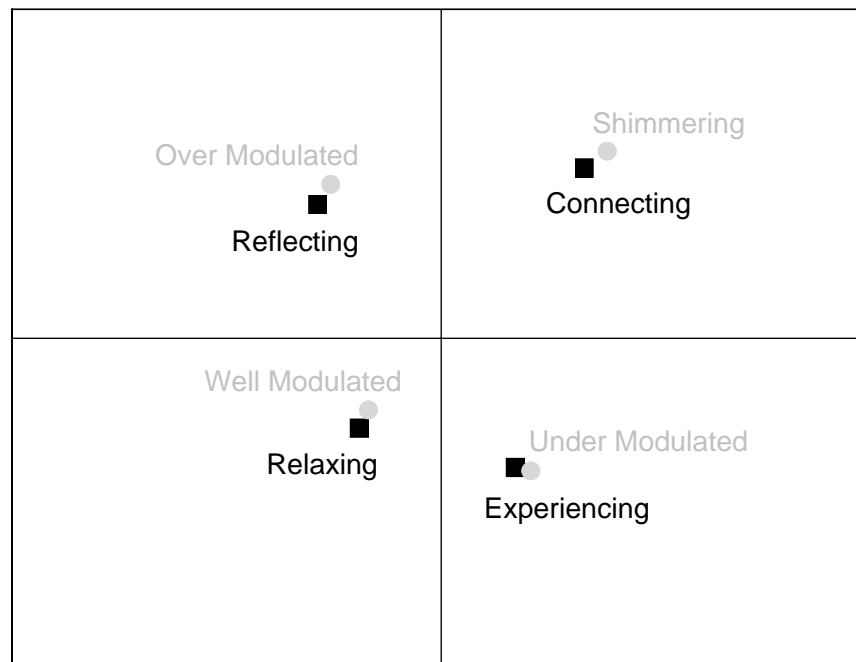


Figure 4. Correspondence analysis for case Piero ( $N = 17$  sessions) for states of mind and emotion–abstraction patterns. Similar concepts are next to each other.

(Mergenthaler, 2003), cognitive (Nicolò et al., 2000), cognitive-behavioral (Kraemer et al., 2007), emotion focused (Mergenthaler, 2004; Lepper & Mergenthaler, 2007a), psychoanalysis (Bucci, 1997, pp. 280–304), psychodynamic (Mergenthaler, 1996; Pfäfflin & Mergenthaler, 1998; Roussos, Acosta, Juárez, & Mergenthaler, 2001), and systemic (di Marino & Mergenthaler, 2003)—as well as in group therapy (Sabel, 2007; Lepper & Mergenthaler, 2005; Fontao & Mergenthaler, 2002). We found connecting events across all those therapies to be associated with outcome and treatment success. We have also examined a number of different diagnostic groups, including borderline personality disorder (Nicolò et al., 2000), schizophrenia (Kraemer et al., 2007), eating disorders (Fontao & Mergenthaler, 2005b; Michal et al., 2001), depression (Lepper & Mergenthaler, 2007b; Mergenthaler, 2003, 2004), trauma (Mergenthaler, 1999), and more. Again here, we found connecting events across all those diagnostic groups to be associated with outcome and treatment success.

*Experimental manipulation.* So far we have conducted two experimental studies that manipulate single aspects of the model to provide evidence for their effect within the model. One of these studies explored the effects of negation on cognitive skills (Maier, 2008). This aspect is important along with the second critical moment in which broadening needs to be activated and one possible intervention was proposed, namely to use negated positive terms instead of negative formulations. We hypothesized that negated positive formulations such as “no good” would have a different effect on cognitive skills functioning than the linguistically corresponding negative term “bad,” although semantically these two statements are similar. The preliminary results seem to support this notion with a better performance on a problem-solving task in the case of negated positive terms.

The other experimental design was a study (Pfeifer, 2006) in which we were trying to find some evidence that the stimulation of the left hemisphere will result in more positive emotion and, therefore, in an increased capacity to solve problems. It has been demonstrated that writing as opposed to speaking results in higher regional cerebral blood flow in the contralateral hemisphere of the writing hand, resulting in an asymmetric activation of the brain additional to the task-specific activation. For right-handed participants, we, therefore, can expect that the left hemisphere will have an increased regional cerebral blood flow and thus an increased likelihood for positive emotions to show up (as a result of activation spreading). This ideally would result in an

increased capacity of problem solving (broaden-and-build; “Aha!” effect). In a speaking/writing task in the sense of Pennebaker’s expressive writing (2004) about stressful life events, we found support for these assumptions.

*Time line.* Causes and mediators must temporally precede change. As Kazdin (2007) notes, this is the Achilles’s heel of treatment studies and thus of ours. We have some evidence from qualitative and clinical evaluations of cycles that they precede or coincide with change. Statistical support needs to be provided.

*Gradient.* The question of whether a gradient can be shown in which stronger doses or greater activation of connecting or more frequent cycles will be associated with greater change in the outcome has not yet been addressed. Clearly, it needs more than just a few cycles and connecting to achieve several mini-outcomes that lead to a general outcome. Possible answers and study plans may come from neurobiology, because it appears to be rather a question of at what rate neuroplasticity occurs, of how much firing neural nets need to change their behavior and constitute persistent change. Phenomena like sudden gain and their neural correlates should be considered here.

*Plausibility or coherence.* One of the major goals was to demonstrate plausibility or coherence of the explanation given with the resonating minds theoretical conception of how the TCM operates and how it is integrated in findings with other and broader scientific knowledge. Above all was the question, How plausible, or how feasible, is this approach to clinical practice? The TCM was first presented at the 1992 Society of Psychotherapy Research annual meeting at Berkeley, and initial feedback indicated that the model made sense to clinicians and that they could think of moments in their practice where they made an observation that fit the model. Most of this feedback is, however, rather anecdotal and needs to be replicated in formal studies. I give a very brief overview of ongoing and completed studies in which other scientific domains become integrated with the cycles model: attachment, conversation analysis, group therapy, metaphor, silences, rate of speech, metacognition.

*Attachment.* Several studies have shown that attachment style and connecting seem to be related. Dismissing participants had least connecting, preoccupied participants had most connecting, and securely attached participants showed a medium amount of connecting in the Adult Attachment Interview (Buchheim & Mergenthaler, 2000,

2002). Using the Adult Attachment Projective (George, West, & Pettem, 1999), securely attached participants were found to prefer preconstructed stories that represented a connecting pattern, in contrast with insecurely attached participants, whose preference was for experiencing or reflecting stories (Holzer, 2007). Gril, Altmann, and Mergenthaler (2000) showed that connecting events were associated with signs of secure attachment of the mother with her baby.

**Conversation analysis.** Conversation analytic theory is predicated on the assumption that speakers create interpersonal meaning by building each turn on the previous turn and creating the conditions for the following turn. It is a way of observing how minds resonate at the level of observable interaction. In a set of three studies, a single group therapy session (Lepper & Mergenthaler, 2005), a short-term psychodynamic individual therapy of eight sessions (Lepper & Mergenthaler, 2007b), and a 15-session emotion-focused therapy (Lepper & Mergenthaler, 2007a), it has been shown that topic coherence and topic sequence length, key concepts in conversation analysis, are significantly higher within cycles and connecting word blocks. Further, the CM graphs identified moments in therapy sessions of heightened activity and therapeutic change, but also identified ruptures in the turn-by-turn interaction that could then be analyzed in more detail.

**Group therapy:** CM analysis of the talk of patients in group therapy, taken as a whole, shows that cycles occur in the same way as in individual therapy (Fontao & Mergenthaler, 2002). This is striking evidence for resonating minds, connecting correlates with insight (Fontao & Mergenthaler, 2005a, 2005b, 2007).

**Metaphor.** Unconventional metaphors are more frequent in and before moments of connecting (Gelo, 2007; Gelo & Mergenthaler, 2003). This is seen as evidence for therapeutic change, because patients in such moments often miss words and use unconventional metaphoric language to express their new thoughts and feelings.

**Silences.** Following the Pausing Inventory categorizing system (Levitt, 1998; Frankel, Levitt, Murray, Greenberg, & Angus, 2006), it has been shown that high reflective pauses—one of the productive silences—occur more often within a cycle and before connecting events. After high reflective pauses, we found more often experiencing (Mergenthaler & Levitt, 2005).

**Rate of speech.** Tonti (2006) developed a computer-assisted system to measure rate of speech from audiotapes. Comparing these data with the CM language measures showed that high levels of emotion and abstraction tend to slow down speed. This may be due to elaboration or retrieval processes.

**Metacognition.** Semerari, Carcione, Dimaggio, Nicolò, and Procacci (2007) reported that difficulties with self-reflection as obtained with their Meta-Cognition Assessment Scale coincides with low frequency of connecting.

**Other applications.** Kraemer et al. (2007) compared two cases of a cognitive-behavioral therapy (one good outcome, one poor outcome) and found key sessions marked by connecting in the good-outcome case and experiencing, which leads to a psychotic episode, in the poor-outcome case. A single case study with a sexual offender has provided a clear example of how this patient learned from the therapist how to connect feelings and thoughts (Böhmer, Mergenthaler, & Pfäfflin, 2003; Pfäfflin, Böhmer, Cornehl, & Mergenthaler, 2005). Ways of how the therapeutic cycles model and CM could be applied to supervision and training were shown by Mergenthaler (2002).

## Limitations

Most of these findings provide support for the concept of resonating minds and its empirical assessment with the TCM. It might be worth mentioning that no studies revealing inconsistencies or contradicting results have been found so far. However, the allegiance effects in treatment research need to be mentioned. With the exception of two studies, I, as the author of the RMT, have been involved and might have biased the finding in a preferred way. Following Hollon's (1999) comments on allegiance, this effect in many of our studies may not be that critical. For example, in the cross-validation studies, the second construct, be it attachment style, topic analysis, group therapy mechanisms of change, types of metaphor, or classification of silences, always was assessed by an expert in that field with no knowledge of the TCM or the CM results.

## Artifacts

The TCM is using word blocks or full sessions as scoring unit and counts the number of emotional tone and abstract words within them, thus only measuring whether these two categories occur together within the same unit and not whether they are

related semantically to each other. Brenner (2007) has rated a larger sample of connecting word blocks on a scale ranging from +3 (*insight*, i.e., semantically related) to -3 (*artifact*, i.e., no semantic relationship between the two categories). In psychodynamic therapy sessions with patients with personality disorders, he found only few artifacts, whereas in sessions with sexual offenders there were a significant number of artifacts. It will be necessary to develop steps that will enable the CM to find such artifacts automatically.

### Future Directions

The RMT is a neurobiologically informed approach to the description and explanation of psychotherapeutic change. The TCM may provide a window for observation of the relationship among the neurobiological, psychological, and interpersonal levels of resonating minds. It associates psychological shifts with underlying shifts of regional cerebral blood flow or cerebral activity from the right hemisphere toward the left. In TCM, such shifts are observable on the psychological level. As a working model, I have adopted the valence theory of emotion with a lateralization of negative emotions in the right brain and positive emotions in the left brain. Thus, a shift from deepen-and-provide toward broaden-and-build can be observed as a shift from negative experiencing toward one marked by positive emotion. Although there is some evidence that this shift corresponds with the neurobiological level, other positions may be supported as well.

There is also evidence that emotions of withdrawal are processed in the right brain and those of approach in the left brain. Certainly, there is a natural overlap between positive emotions and emotions of approach as well as for those characteristic of negative valence and withdrawal. The valence theory predicts that negative emotions like anger would be processed in the right hemisphere. However, anger can be understood as an emotion of approach, consistent with the view of approach and withdrawal. Then it would be predicted that anger processing would be located in the left hemisphere. Such inconsistencies could be the focus of further empirical studies with the RMT. It also might be of interest to find out how other emotion dichotomies like adaptive/maladaptive (Goldman, Greenberg, & Angus, 2006, p. 540) would fit under one of these "hats." It may well turn out that some of these and a subset of the positive emotions and additionally the negative emotions of approach contribute to a shift on the neurobiological level and hence on the psychological level. This notion implies that not

merely an activation shift toward left would contribute to therapeutic change, but possibly an increase of activation in both hemispheres, preferably in the forebrain. Evidence for such a position, both psychologically and neurobiologically, may be found in the studies with motivation that I briefly refer to next.

Zuroff et al. (2007) propose autonomous motivation for therapy as a new common factor, at least in brief treatments for depression. Interestingly, these authors state that autonomous forms of motivation "were positively related to reports of positive mood during sessions" (p. 138). Magda Arnold has developed a theory of emotion and motivation that points to such relationships (for an overview, see Gasper & Bramesfeld, 2006). Also, Ryan and Deci (2000), in their self-determination theory, focus on well-being with the notion that in interpersonal settings intrinsic motivation is "more likely to flourish in contexts characterized by a sense of security and relatedness" (p. 71). Experimental psychology provides additional support for some similarities between specific emotions like happiness and motivational states (Miron, Parkinson, & Brehm, 2007). In the clinical realm, motivation plays a central role for motivational interviewing (Miller, 1996) and its inherent "change talk" that corresponds to moments of connecting. Motivation for psychotherapy has been found to be crucial for therapy outcome (Timmer, Bleichardt, & Rief, 2006; Rumpold et al., 2005). Finally, on a neurobiological level, there is some evidence that motivational effects are underpinned by engagement of a specific forebrain region (Pessiglione et al., 2007). This means that, as with positive mood, the emergence of motivation as an additional activity in the right forebrain as well as in the left forebrain takes place. Thus, it may be difficult to tell whether positive emotions, emotions of approach, or autonomous motivation causes a shift toward more left hemispheric activity. With regard to the importance of motivation, it may be that in the future the function of the shift event will have to be simply expressed as an activation shift from a dominant right hemisphere toward the left with the goal of establishing an equilibrium and resulting enhanced information processes within the brain areas. Positive emotion then could be seen as one means of empirically assessing such changes. Measures for autonomous motivation (Sarracino & Dazzi, 2007) additionally could be applied, although for computer-assisted transcript analysis they need to be developed first. Broaden-and-build then will have to be understood as a state that is supported by all three: positive emotions, emotions of approach, and autonomous motivation.

Not represented in the resonating minds theoretical conception or in RMT are moderators like gender, setting, frequency, and therapist effect. Especially for language processing, an increasing number of studies (e.g., Kansaku, Yamaura, & Kitazawa, 2000) suggest that women use some brain areas more bilaterally during linguistic processing of global structures in a narrative than men do. However, hormonal dispositions, along with the menstrual cycle, have also been shown to influence emotion processing and interpersonal relations (e.g., Turner, Altemus, Enos, Cooper, & McGuinness, 1999). With regard to frequency, the effect of therapeutic interventions seems to be completely understudied. This and other criteria will have to inform our future research plans. The timing of interventions has had some attention (Gilboa-Schechtman & Shahar, 2006). It also might be of interest to see how the method presented here, and operating on a rather formal level, might converge with other more clinically oriented approaches to process research like the task analysis and especially the “events” that seem to show a similar structure as the therapeutic cycle (Greenberg, 2007).

### Conclusions

We have been able to observe therapeutic cycles in at least nine distinct and common approaches to psychotherapy. Given the fact that, in the context of child and adolescent therapy alone, more than 550 psychotherapies can be delineated (Kazdin, 2007), Kazdin's observation that “it is not very likely that the different treatments produce change for different reasons” (p. 4) seems apposite. Shift events are understood as interventions that lead to and are responsible for change regardless of the diverse therapeutic orientations. Connecting may be what many of these orientations share as a common mediator.

I agree with Gabbard (2000) that “advances in neuroscience research have led to a more sophisticated understanding of how psychotherapy may affect brain functioning. These developments point the way towards a new era of psychotherapy research and practice in which specific modes of psychotherapy can be designed to target specific sites of brain functioning” (p. 117). The resonating minds theoretical conception takes this up, linking mind, brain, and psychotherapeutic activity with each other. All three are inseparable. This is not always reflected in the literature, although we find plenty of writing bringing together two corners of this triangle: mind with brain, brain with psychotherapy, and psychotherapy with mind. With this article, I hope to have started a reconstruction of the triad, certainly

taking the risk that the mechanisms of change I have proposed are largely speculative at this time.

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### Note

- <sup>1</sup> Available from the author per e-mail request at no charge for scientific purposes. Currently, English, German, Italian, and Spanish dictionaries are supported.

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