

Dance/Movement Therapy: Learning to Look Through Video Microanalysis

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Abstract This study examines the movement behavior of a therapist and her client during one dance/movement therapy (DMT) session, through the lens of mother-infant face-to-face communication research conducted with video microanalysis. Dance/movement therapy and mother-infant interaction research have in common a focus on the details of movement patterns and how these patterns are coordinated between two people. Microanalysis of movement patterns operates as a “social microscope,” revealing aspects of a subterranean world of communication within the dyad, which are too rapid for the naked eye to grasp in real time. We present a microanalysis of the movement patterns of the first 80 s of a DMT session conducted by the first author with an adolescent diagnosed with Autism Spectrum Disorder. Our goal was to describe moments of coordination and patterns of disruption and repair that were not visible in the video when played in real time. We present drawings based on the video microanalysis to illustrate two clinically meaningful moments in the first 80 s of the session. Through this detailed description and the drawings, we illustrate: (a) how the therapist in training understood more about her own process of learning to become a dance/movement therapist; (b) what microanalysis of a very short segment of time can reveal about this specific dyad; (c) how microanalysis may be useful to the DMT profession.

Keywords Autism · Dance/movement therapy · Mother-infant research · Video microanalysis · Training dance/movement therapists

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Introduction

This study examines the movement behavior of a therapist and her client during one dance/movement therapy (DMT) session, through the lens of mother-infant face-to-face communication research conducted with video microanalysis. Microanalysis of movement patterns and the study of their coordination have been used as a way of understanding mother-infant face-to-face communication and its disturbances since the 1970s (Beebe & Stern, 1977; Beebe, 2005; Beebe et al., 2008, 2010; Stern, 1971, 1985, 1995; Trevarthen, 1977, 1979; Tronick, 1989, 2007). Dance/movement therapy and mother-infant interaction research have in common a focus on the details of movement patterns and how these patterns are coordinated between two people. The essential connection between the two fields is the assumption that relationships are co-created through movement behavior.

Microanalysis of movement patterns operates as a “social microscope,” revealing aspects of a subterranean world of communication within the dyad that are too rapid for the naked eye to perceive in real time (Beebe, 2014; Beebe & Stern, 1977; Stern, 1971, 1985). When the first author (RH) read the work of Beatrice Beebe using microanalysis of mother-infant communication to predict attachment patterns (Beebe et al., 2010), she decided to study microanalysis with Beebe. In this report, microanalysis was used as an observational tool (rather than a research tool) to study the movement patterns of one DMT session. Similar to the study of mother-infant interaction, study of a small portion of a DMT session seemed likely to capture characteristic movement patterns and thus to reveal ways in which a relationship is co-created by therapist and client.

We present a microanalysis of the movement patterns of the first 80 s of a DMT session conducted by the first author with an adolescent, Kyle, who was diagnosed with Autism Spectrum Disorder (DSM-5, Level 3). Level 3 indicates deficits in both social-emotional reciprocity and repetitive patterns of behavior. Our goal is to describe moments of coordination, and patterns of disruption and repair, that were not visible in the video viewed in real time. We present drawings of two clinically meaningful moments in the first 80 s of the session. Through this detailed description we illustrate (a) how the therapist in training, RH, understood more about her own process of learning to become a dance/movement therapist; (b) what microanalysis of a very short segment of time (80 s) can reveal about this specific dyad of RH and an adolescent with autism; and (c) how microanalysis may be useful to the DMT profession. This study offers dance/movement therapists an opportunity to understand their work from a new perspective.

Dance/Movement Therapy

Over the last 75 years, dance/movement therapists have described the power of the body and movement as the primary vehicles of therapeutic transformation (Chace, 1945, 1953; Dosamantes-Alperson, 1974; Dosamantes-Alperson & Merrill, 1980; Espenak, 1981; Levy, 1992). Founders in the field intuitively understood that movement is the universal and ancient language of human relationships (Lewis &

Avstreich, 1984; Schoop, 1974; Smallwood, 1978). Dance/movement therapists have employed systems of movement analysis such as the Kestenberg Movement Profile (KMP) (Kestenberg Amighi, Loman, Lewis, & Sossin, 1999) and Laban Movement Analysis (LMA) (Bartenieff, 1980; Laban, 1956), to understand how the body moves, to describe movement patterns, and to track movement as an indicator of a client's development and therapeutic growth. These systems focus observation on such elements as tension-flow and shape flow rhythms (KMP), and effort, direction, space, and force (LMA). The KMP approach to analyzing movement has been used both in research on mother-infant interaction and in the DMT profession (Bromberg, Herbst-Paparne, Sossin, Beebe & Ward, 2016; Lewis, 1990; Lewis & Loman, 1992; Loman & Merman, 1996; Reale, Sossin, Beebe, Ward & Endres, 2012; Sossin, 2002).

Disruption and Repair

One of the core principles in DMT is that through therapeutic dance and movement, individuals may be able to repair early relationships. As Tortora (2011) notes, dance/movement therapists' "interventions enable patients to explore early relationship patterns by actually experiencing new ways to engage with self and other in the moment-to-moment explorations, both of which are physical and psychological in nature" (p. 9).

The concept of disruption and repair in infant research informed our microanalysis of this DMT session (Beebe & Lachmann, 1994; Tronick, 1989). Mothers and infants do not necessarily match their states of engagement during normal successful play encounters (Kronen, 1982; Malatesta & Haviland, 1982). Indeed, Tronick and Cohn (1989) found that mothers and infants at play continuously shifted back and forth between "matched" and "nonmatched" states, spending approximately only one-third of their time in matched states. In matched states, both mother and infant might be in a state of "social play," looking and smiling; or they might both be in a state of "social attend," looking at each other with a neutral face without smiling. In a state of nonmatch, a mother might be engaged in "social play," but the infant might be in "social attend." Tronick and Cohn (1989) found that when the two partners enter an unmatched state, within two seconds 70 % of the unmatched states return to a match.

Furthermore, an analysis of which partner is responsible for the repair showed that both mothers and infants influence the repair sequence (Cohn & Tronick, 1989; Tronick & Cohn, 1989). When less coordinated states occur, there is a powerful tendency to "re-right" the interaction by returning to a more coordinated state within 2 s. Thus, repairing disruptions is a pervasive interactive skill for infants. The reparative function is a mutually regulated achievement (Beebe & Lachmann, 1994, 2002; Tronick, 1989, Tronick & Gianino, 1986). Beebe and Lachmann (1994) suggested that the experience of repair increases the infant's *effectance*, elaborates coping capacity, and contributes to an expectation of being able to repair, which can be brought to other partners. These capacities provide one definition of what is being organized in the infant's expectancies of interaction patterns of disruption and repair. The expectation is established that repair is possible (Tronick, 1989).

Moreover, infants who experience more repairs of mismatches (disruptions) are more likely to be securely attached at 1 year (Cohn, Campbell & Ross, 1991).

Dyadic Systems View

We bring to this study a dyadic systems view of two-person communication that grew out of mother-infant research (Beebe & Stern, 1977; Beebe, Jaffe, & Lachmann, 1992; Beebe et al., 2016; Sander, 1977; Stern, 1971; Tronick, 1989; Trevarthen, 1977, 1979). In a dyadic systems view, “any interaction of the individual is jointly defined by the individual and the partner” (Jaffe, Beebe, Feldstein, Crown, & Jasnow, 2001, p. 26). The dyadic systems view posits the relational matrix as a system, in which each individual affects and is affected by the other. The mutually regulated repair of disruption illustrates this concept of mutual influence. However, each person also brings his or her own primary activity and active self-regulation to the interaction (Sander, 1977). Through coordination of patterns of action, the dyadic system further differentiates and potentially reorganizes the behavior of both partners (Fogel, 1993; Jaffe et al., 2001). In modern systems models of development, reciprocal co-created coordination (bi-directional regulation) is proposed to be the “engine” of development (Gottlieb, Wahlsten & Lickliter, 1998; Jaffe et al. 2001). In this sense, the coordination of movement, in and of itself, is potentially a mode of transformation in development and a mode of therapeutic action.

Microanalysis

Dance/movement therapists sometimes use slow-motion viewing of videotaped sessions in order to better understand their interactions with their clients and the flow of the session (T. Ehrhardt, personal communication, December 13, 2012; Tortora, 2006). However, microanalysis makes it possible to describe movement patterns between individuals with extreme accuracy by using a uniform small time-unit, such as one second (Beebe et al., 2010). Often the movements last under $\frac{1}{2}$ s (Beebe, 1982), and in digital video, one second is usually composed of 30 frames. The viewer can move back and forth across frames that represent fractions of a second, identifying the maximum change points in each movement. In this way, the viewer is able to see exactly where a movement begins and ends, and how one individual moves in direct response to the other’s movements. Thus microanalysis can reveal aspects of nonverbal communication that slow-motion viewing may not.

Daniel Stern was a pioneer in using microanalysis in mother-infant research. In his early work, Stern experimented with filming dancers (1977). He replayed, slowed down, or reversed film in exploring new ways of seeing the dancers’ movements, the interactions between the dancers, and the creation of meaning through movement. He videotaped mothers and infants in real-life, spontaneous interactions, and studied their movement behavior with microanalysis. While studying the fields of both dance and mother-infant behavior, Stern saw that the primal nonverbal relationship between mother and infant is created through an exchange of movements, a “dance.” Indeed, the working title for his book, *The*

First Relationship, in which he discusses his groundbreaking ideas about mother-infant interaction, was “The First Dance” (Stern, 1977).

In our study, microanalysis revealed startling aspects of communication between the therapist (RH) and her client, Kyle. We chose a 1/10th second time unit to perform the microanalysis. It rendered visible ongoing tiny shifts of coordination, and sometimes disruptions and repairs, too rapid for the naked eye to see. For example, the very first 3/10 s of the session revealed a moment of “RH approach—Kyle withdraw,” which was embedded within a mutual gaze encounter. Such approach-withdraw patterns have been described in mother-infant research (Beebe & Stern, 1977; Beebe et al., 2010; Stern, 1971). In this first 3/10 s, microanalysis also revealed a discrepant orientational “withdrawal—visual approach” pattern within Kyle’s own movements. As RH walked toward Kyle, who was at the other end of the room, Kyle increasingly shifted his orientation and body weight away from her: a withdrawal every 1/10th of a second. But Kyle continued steady eye contact with RH, which can be interpreted as an “approach.” His movements were so small that they were not visible in the session itself, nor easily noticed when viewing the video at regular speed, nor even in slow motion.

We were able to identify the tiny shifts of this subtle yet critical exchange only through frame-by-frame microanalysis, using the 1/10th second time unit. Larger time units, such as ½ second or one second, seemed to miss many important events. This 1/10th second time unit made sense to us based on early studies of micro-timing in mother-infant interaction which used 16 mm film (24 frames per second). Using this time-unit, Beebe and colleagues (Beebe & Stern, 1977; Beebe, 1982; Beebe, Stern, & Jaffe, 1979) showed that the duration of most mother and infant movements observed during face-to-face communication, such as small shifts of gaze, head orientation, and mouth opening, last in the range of ¼ to ½ second. Cohn and Beebe (1990) compared varying sampling units of 1, ½, 1/3, ¼, and 1/12 s in analyzing mother-infant communication. The ability to detect bi-directional coordination, in which each partner’s behavior was predicted by the other’s just prior behavior, was best using the 1/12th second sampling unit. In the current study, microanalysis using the 1/10th second time unit enabled us to observe Kyle’s movement patterns, which were surprisingly rapid and socially aware; and to see subtleties of these fleeting interactions, including various forms of interpersonal coordination and “mis-coordination.” RH found that microanalysis taught her to *see* the conversation between herself and her client unfold in the form of interpersonally coordinated fleeting moments.

Thin Slices of Behavior

In our study we use a small portion of the session, the first 80 s, to illustrate our approach. Because interaction patterns tend to be repetitive and are highly organized, a small chunk of time is sufficient to capture characteristic movement patterns between two people (Ambady & Rosenthal, 1992). Face-to-face interaction between mother and infant has a relatively stable structure that generates robust session-to-session reliability (Cohn & Tronick, 1989; Moore, Cohn, & Campbell, 1997; Weinberg & Tronick, 1991; Zelner, Beebe, & Jaffe, 1982). In Beebe et al.

(2010), 2.5 min of mother-infant interaction of each dyad at 4 months, coded at the 1-s unit, was sufficient to predict infant attachment patterns at 12 months.

A review by Ambady and Rosenthal (1992), entitled, *Thin Slices of Expressive Behavior as Predictors of Interpersonal Consequences*, supports the concept that small segments of time can reveal important information. They performed a meta-analysis of 38 studies of adult expressive behavior in relation to various interpersonal outcomes. All of the studies evaluated used short periods of observation of expressive behavior. Accuracy in predicting interpersonal consequences did not differ among observations, which varied from 30 s to 5 min; samples of less than 5 min did not differ from those based on longer samples. The type of behavioral channel (face, speech, body, voice tone) on which the ratings of expressive behavior were based was not related to the accuracy of predictions. Moreover, the effect-size in samples less than 5 min was higher than most effect sizes in social psychology.

Ambady and Rosenthal (1992) concluded that their results “reveal that we unknowingly encode and decode a great deal of information regarding various aspects of ourselves.... The probabilistic expectancies we form about others from very limited information are more accurate than we would expect” (p. 269). They also note that:

Much of this expressive behavior is unintended, unconscious, and yet extremely effective. For example, we communicate our interpersonal expectancies and biases through very subtle, almost imperceptible, nonverbal cues. These cues are so subtle that they are neither encoded nor decoded at an intentional, conscious level of awareness.... The remarkable aspect of this expressive behavior is its communicative power. A great deal of information is communicated even in fleeting glimpses of expressive behavior (Ambady & Rosenthal, 1992, p. 256).

Polanyi (1966) called this *nonconscious tacit knowledge*. Lyons-Ruth (1998) termed it *implicit relational knowing*. In general, mother-infant research refers to infant *expectancies* of interaction patterns to capture this process (Beebe & Lachmann, 2002; Beebe et al., 2010). A window into this kind of knowing is opened through microanalysis. Indeed, microanalysis provided us an opportunity to observe nonconscious procedural forms of coordination within the DMT dyad.

Terms

Some of the terms that we use are based on the research of the second author (Beebe et al., 2007, 2008, 2010, 2016). We define interpersonal *coordination* most generally as probabilities of the degree to which each individual’s behavior can be predicted from the prior behavior of the partner. Because we did not use statistical modeling in this study, we use the term metaphorically to indicate patterns of movement coordination that we detected through microanalysis. Coordination generally characterizes sequences in which both partners move quasi-simultaneously, or in rapid succession.

A DMT term that we use is *kinesphere*, a seminal concept from LMA (Bartenieff, 1980), which informed our microanalysis of the interaction between RH and Kyle. Individuals experience this near-distance space as private, and when another person enters this space, it is potentially an intrusion, depending on the context. Bartenieff (1980) wrote, “By extending the farthest reaches of the length, width and depth of the body in the upright position, a sense of the three-dimensional space around it is created. We call that reach space around the body the kinesphere” (p. 25). RH and Kyle often explored personal boundaries. While moving toward and away from each other, they gradually found comfortable distances from each other. In the video, there is a significant moment of disruption when Kyle comes within a foot of RH’s kinesphere, and she responds with a distinct withdrawal. This interaction is explored in the microanalysis.

We use the term *mirroring* consistent with its use in dance/movement therapy. Mirroring implies a state of unspoken connection or similarity between two people, reflected in ways of moving that indicate (procedural) awareness of the other’s emotional and bodily states. McGarry and Russo (2011) note that, “Mirroring involves imitation by the therapist of movements, emotions, or intentions implied by a client’s movement, and is commonly practiced in order to enhance empathy of the therapist for the client” (p. 178). However, terms that are used in DMT are often defined differently in mother-infant research. For example, in analyzing mother-infant face-to-face interaction, Beebe uses the term mirroring to refer to facial mirroring and defines it based on statistical documentation that each partner follows the direction of the other’s affective change (Beebe et al., 2010). As another example, the term *synchrony* is often used in a broad way in DMT, capturing ideas similar to *mirroring* (or *attunement*). In contrast, the term *synchrony* has a specific definition in Beebe’s work, that is, the unison of onset and offset of behavior changes over time (Beebe, 1982).

Description of Kyle

Kyle lived in a residential treatment center specializing in the care of individuals with Autism Spectrum Disorder who were unable to live at home. In both his classroom and his living space, the adult to student ratio was five adults to six children, which is indicative of the high level of care he required to function throughout the day. He was involved in other therapeutic treatments, such as speech therapy and occupational therapy, and he was also part of a weekly DMT group therapy session, led by RH.

Kyle’s tools for communication were rudimentary. Without the use of any formal verbal language, he was silent for stretches of time, sometimes making his own sounds to express particularly urgent needs or anxiety. While he used hand movements to signal needs, he did not use American Sign Language. He was able to identify and utilize some visual tools, such as pictures of objects or activities, to which he could point. He used eye contact, covering his ears, touching his face, turning his body away and sitting down to indicate connection or disconnection, and to cope with overstimulation. According to his teacher, in particularly difficult situations in the classroom he sometimes isolated himself, yelled, or fell to the floor.

These many limits indicate his deficits in social communication and reciprocity. In one-on-one DMT sessions, he sometimes displayed these behaviors, but he did not cover his ears, sit down, yell, or fall to the floor. The only perseverative behavior Kyle manifested in DMT sessions was an effort to remove a yoga mat from the cabinets in the room. Upon entering the room, he always indicated this desire with the same hand movement and verbal sound. In his school environment, there were additional repetitive patterns.

The method section of this study describes the context of the DMT session, how it was videotaped, and the selection of the segment of the DMT session examined. The results are presented in the form of a qualitative first-person (RH) narrative of the 80-s segment. Both authors together conducted frame-by-frame analyses of two brief, clinically significant sequences; they are embedded in the narrative. One of these sequences occurs at the beginning of the 80 s analyzed, and one at the end. These two microanalyses are illustrated with drawings of selected frames. The discussion addresses potential implications of our study for the field of DMT.

Method

Participants

The participants were the therapist (RH) and her client (Kyle). The therapist was in the final year of her master's DMT training at a program approved by the American Dance Therapy Association (ADTA). Kyle was an ambulatory nonverbal 16-year-old male diagnosed with Autism Spectrum Disorder (DSM-5, Level 3 in both deficits in social-emotional reciprocity and restricted, repetitive patterns of behavior).

Setting

The sessions took place in a multi-purpose room near Kyle's classroom. Along the walls were treadmills, counters, and shelving where exercise equipment was stored. The camera distance was approximately 15 feet from the face-on view of Kyle and eight feet from the back-view of RH. Over the course of the 80-s segment analyzed, their distance from each other ranged between two and 15 feet. The full body of each is visible (Kyle face-on, RH back-view).

The Sessions

For both RH and Kyle, their work together was a new experience: RH had never worked one-to-one with an individual diagnosed with Autism Spectrum Disorder, and Kyle had never had individual DMT sessions. RH met with Kyle once per week for 30-min individual DMT sessions. The session described below was the fourth of about 20 in the course of his treatment with RH. During these sessions, RH generally followed Kyle's lead in the patterns of movement, energy level, amount of connection, and formality of direction, which seemed optimal.

The sessions often began with RH leading Kyle in some sort of directed movement. Because he was often not able to follow and imitate directed movement, RH usually was able to adapt and take cues from his movements and moods. This often took the form of mirroring, following, and moving with Kyle. His movement patterns often involved moving toward and away from RH in the sagittal plane, such that forward and back movement was explored and exaggerated during the session. His movement also often evolved into a horizontal swaying movement, which RH followed and worked with. Sometimes the two partners simply sat on the floor, breathing and rocking, or RH repeated Kyle's sounds back to him. RH generally approached the session as an intuitive and improvisational exploration of the movement patterns and gestures made by Kyle.

Selecting the Segment for Study

The first 80 s of the session told a coherent clinical story of the efforts of the two partners to begin to engage with each other. When the video of these 80 s was viewed, both in real-time and in slow-motion, we saw that RH and Kyle engaged in movement patterns that suggested both approach and desire to connect, as well as hesitancy and withdrawal. After a few experiences of disruption and repair, the partners' first physical connection occurred at the 80th second of the session, when they clapped hands. This is the 80-s segment of the session we selected for analysis.

The drawings

The first step of study was the creation of an extensive written narrative of the first 80 s, based on examination of the video in both real-time and slow motion, and written from RH's perspective. From this detailed narrative, we chose two sections to illustrate, with drawings to represent our frame-by-frame analyses. One section occurred toward the beginning of the 80 s (Fig. 1) and the other, toward the end of the 80 s (Fig. 2). Within this narrative we embedded the two sets of drawings. Thus, the overall structure of the description of these 80 s is as follows:

- (1) Description of Seconds 1–15
- (2) Fig. 1: Seconds 5–15 and comments
- (3) Description of Seconds 15–70
- (4) Fig. 2: Seconds 70–80 and Comments

Frame-By-Frame Analyses to Generate the Drawings

Both sections chosen for illustration are approximately nine seconds (90 frames, where one frame = 1/10th second). Thus, to create the drawings for Figs. 1 and 2, we worked with two sets of 90 frames. Our goal was to capture the key changes of the interpersonal movement sequences. From each set of 90 frames we selected about 10 key frames for illustration.

This reduction from 90 frames to 10 or 11 frames was accomplished through frame-by-frame analysis. Instead of viewing each frame as a separate event, the

process of winnowing down the frames involved identifying movements as we moved back and forth between two frames. This technique differs from another application of microanalysis, that is, coding what is happening at a regular pre-selected time unit, such as one second (see Beebe et al., 2010). Instead, we studied sequences to *find the change points* in the movements. We moved back and forth multiple times across each two-frame sequence (from frame 1 to 2, from frame 2 to 3, and so on). We then carefully selected the frames that best captured the critical change points in the movement sequences.

In this manner, we selected the frames that allowed us to see the *mini-plot* (Stern, 1985) of the dyad's movement scenario. By noting the elapsed time between illustrations, the rapidity of these subtle shifts in the communication process becomes evident. It is equally apparent that we did not necessarily select one frame per second. Some frames selected occur within the same second; some skip a second or two. Most of the movement shifts we describe are minuscule and would not easily be noticed in either real time or slow-motion video.

Results

Our description of the major movement themes of the first 80 s of the DMT session offers RH's point of view. Within this narrative we present the microanalysis of the two clinically significant moments and the illustrative drawings. Figure 1 is a 9.2-s sequence that begins in the 5th second of the 80 s reviewed. Figure 2 is a 9.4-s sequence that takes place at the 70th second of the 80-s section.

The Opening of the Session: Narrative of the First 80 Seconds

In the first frame of the video (00.00 [0 s, 0 tenths of a second]), I (RH) step my right leg out to the center of the room, and I stretch my left arm and head toward Kyle in an invitation to join me. The video shows Kyle in front-view and shows me from the back. It is interesting that I use my left arm and hand, as it is my non-dominant side. This nonconscious (out of awareness) choice may be a reflection of lack of confidence. In the first 0.4 s of the session, I complete my step and lower my arm to my side. Kyle stands still at the far side of the room, about 15 feet from me, gazing away from me to his left with his arms crossed and his hands in softly-held fists. As I continue to walk toward him with a strong and forward energy, Kyle shifts his weight progressively and very slightly to his left, away from my advance. These are movements one would not see in regular video or slow-motion video, as they occur in only 0.6 s. My strong forward motion does not match Kyle's minimal movements, and he may be regulating the stimulation of my approach by increasing his distance from me through micro-movements. The time elapsed is now 01:00 s.

At 01:00 s, I take a second step and begin to reach my left hand out. Kyle looks up and makes eye contact, and begins to open his arms and fists. When I am approximately seven feet away from him, 0.4 s later, he gestures with his arms that he wants to get a yoga mat from the closet. Perhaps he is thereby indicating his discomfort at my getting closer. He gestures in this way again while both of us settle, facing each other. At

02:04 s I indicate with a full-arm movement that it's time for us to start our session, saying "It's time to dance." The time elapsed is now 03:07 s.

With my large arm movement I may have initiated a minor disruption between us. I flatten my palms against my thighs in 0.2 s; at the same time Kyle responds to my movement within 0.4 s by lowering his arms and breaking eye contact. Despite this disconnection, Kyle remains facing me and does not move away. Although he is not making eye contact, by examining the next second across tiny 1/10th second intervals one can see that we both relax. I soften my knees and palms, and I start to move toward Kyle again; Kyle steps toward me. By 04:07 s a repair has been made. Perhaps in renewed confidence, we move our arms and step at the same time, synchronized to the 1/10th second. However, at 05:07, Kyle is still looking down. The time elapsed is now 05:08 s. The first set of drawings (Fig. 1) below, illustrates the next 9.2 s.

Guide to viewing the drawings

For ease of understanding the drawings, we labeled each drawing with the time of the frame (00:00 indicates seconds: tenths of seconds). Elapsed time between drawings is shown in the space between the boxes. We recommend that readers view movements by moving their eyes back and forth between the drawings. The goal is to identify changes in movements from one drawing to the next, across two drawings. Viewing each drawing as a static image will not reveal the ways that the two partners coordinate their movements. "Right" and "left" refer to the person's right and left. RH makes eye contact with Kyle throughout the sequence. Below each drawing we provide a brief description of the movements taking place.

Comments on Figure 1

In Fig. 1, drawing 1 (05:08), Kyle's head is down, but he is making eye contact with me (RH). Looking across drawings 1–3 (05:08–06:07), one can see that when we are about three feet from each other, Kyle lifts his head and begins to move his hands up to greet me. He is returning to a movement we have done before, clapping our hands. This occurs specifically in drawing 2 (06:03). Within 0.4 s, however, as he continues to move toward me and is about two feet from me, I withdraw by subtly caving my chest in, lowering my head slightly, beginning to lock my knees, and pressing my palms against my thighs (drawing 3). Kyle has crossed a boundary and moved into my personal space. At 06:03 s our disruption began as Kyle continues to step toward me and is about two feet away (drawing 2). I continue to tighten up more intensely at 06:07, in drawing 3, suggesting that the distance at which I was comfortable was two feet away from Kyle.

Across Fig. 1, drawings 3–5 (06:07–07:07), we both withdraw, but Kyle stays engaged longer than I do. After 0.6 s I tighten up, Kyle continues to move toward me and to keep his arms up. He is really trying to engage. But immediately in drawing 4 (second 07:03), we see the moment when Kyle looks down and I complete my tightening movements (further tightening my buttocks, locking my knees, pressing my palms to my thighs, looking down, and ceasing to move). We are in a mutual withdrawal.

Figure 1, drawings 4–5 (07:03 to 07:07) illustrate that, within 0.4 s of my freeze Kyle looks away and down, turns and pivots to his left, and begins to step away. The speed with which Kyle responds to my withdrawal is uncanny. In real time, it looks as if our movements happened simultaneously. However, using microanalysis, one can see that Kyle's behavior is a split-second *response* to my tightening. He continues stepping back in drawings 5–7 (07:07 to 11:05). Out of my awareness, I have essentially rejected his approach. In drawing 6, at 09:08 s, I curve my back and begin a 2-s freeze, until 11:07 s. This 2-second freeze is a long time, and unusual in these data. It may indicate my extreme wariness, and perhaps fear.

Drawing 8 covers 3/10th of a second. At 11:06, Kyle is about five feet from me. At this moment, he stops moving away from me and starts to turn his head toward me. Then he makes eye contact at 11:08 s, initiating a repair. At this moment I simultaneously relax my knees in a minute movement, perhaps in response to his having started to return his gaze 1/10th second earlier. At 11:09, I initiate a very small and subtle sway to my right. Swaying together is a movement we have done in previous sessions.

From drawing 8–10 (11:06 to 13:06), I start a tiny sway to my right, and continue to soften my knees. Kyle raises his arms and we start to step toward each other. We appear more present and engaged. At drawing 9 (13:03), Kyle steps toward me and starts his own tiny sway. At second 13:04, Kyle looks away to his right. Perhaps this withdrawal helps to balance the emotional connection of stepping toward me and joining my sway. By 0.3 s later, in drawing 10 (13:06), there is again a different energy and quality of connection as we fully commit to each other in a clearly mirrored sway, with his left side and my right side matching movements.

From drawing 10–12 (13:05 to 15:00), our swaying continues to be coordinated. While we are joining each other in swaying, Kyle moves his hands toward his pants pockets, still looking to his right. Perhaps he is using self-touch and gaze aversion to regulate his emotions about our re-connection. In drawing 12 (15:00), we match each other with more pronounced swaying. At this moment, Kyle looks up at me. We have created another repair.

In summary, the 9.2-s story that is told in Fig. 1 is one of wariness, disruption, and gradual repair and reconnection. Five seconds into the session, Kyle is hesitant, as I stand in front of him. Kyle then approaches me, raising his arms to meet me. But beyond my awareness at the time, his movement crosses over into my kinesphere and I freeze and tighten my body. Kyle then approaches me, raising his arms to meet me. My withdrawal results in a disruption of our connection. Kyle immediately turns away and backs off. He then looks up at me to try again, and approaches me a second time. This time I join Kyle by relaxing and beginning a small sway. He joins my sway and then we are able to engage in mirrored swaying. After many extremely subtle and coordinated micro-exchanges, not visible to the naked eye, we connect.

We now return to the narrative, re-entering the video at second 15:00. Our swaying movements have evolved into a quasi-synchronous coordination. We sway together in the same rhythm and direction. Kyle keeps his hands in his pockets, and looks slightly away again, maybe engaging in self-soothing gestures that enable him to maintain the connection with me. This period of coordination lasts 5 s, at the end of which he is intermittently making eye contact, perhaps indicating a growing comfort. The time elapsed in the session is now 20 s.

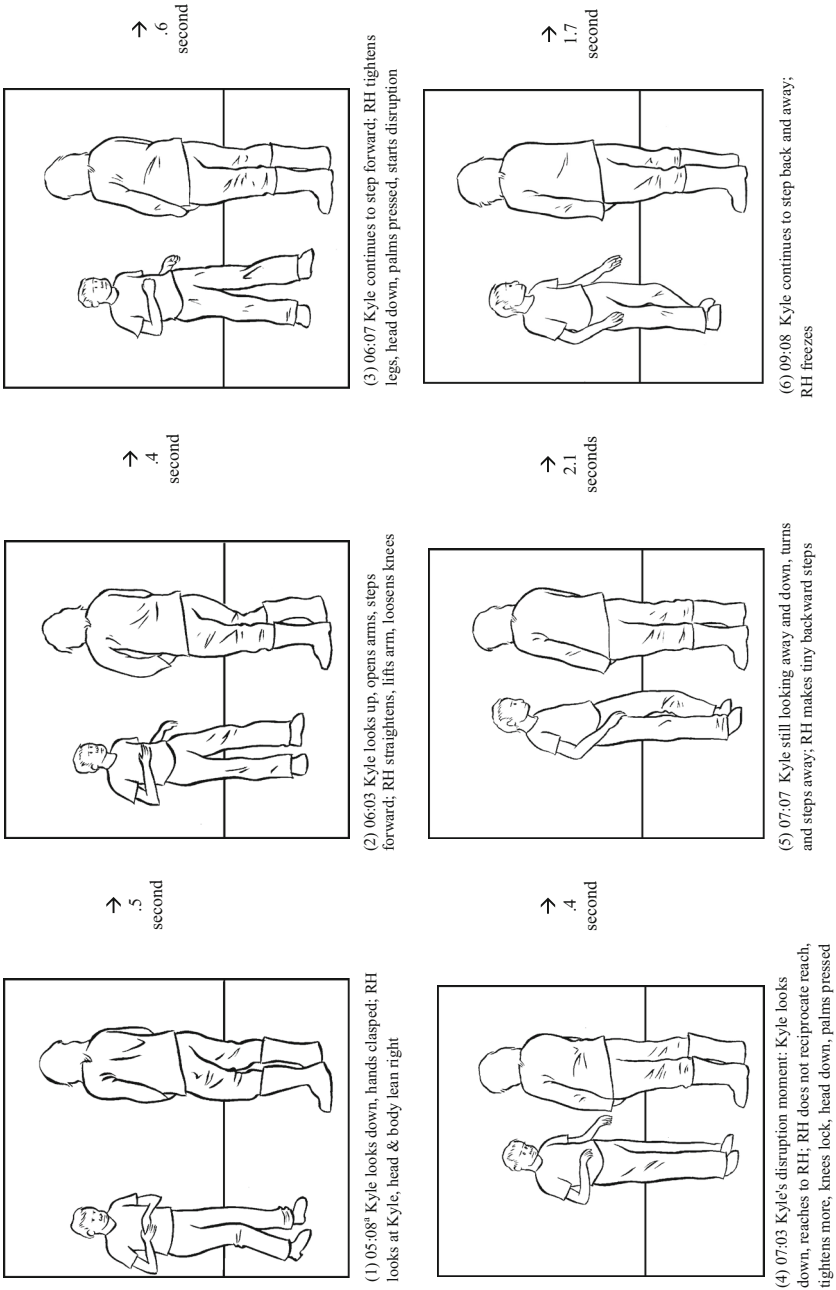
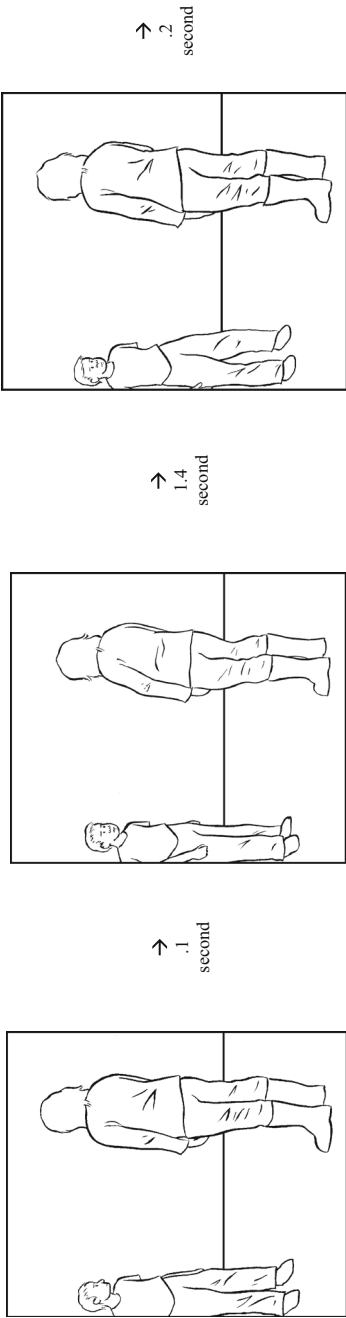
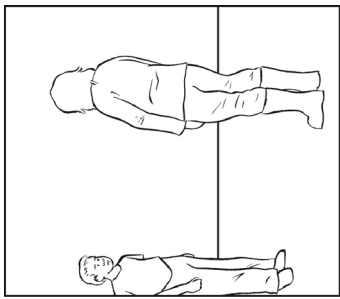


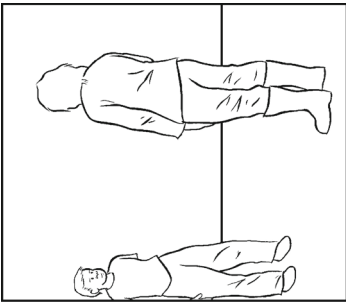
Fig. 1 Disruption and repair: swaying together. Frame-by-frame analysis of 9.2 s (05:08 to 15:00)



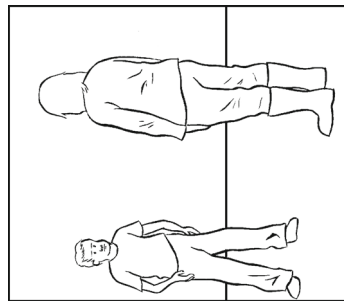
(7) 11:05 Kyle stops stepping away, RH continues freeze



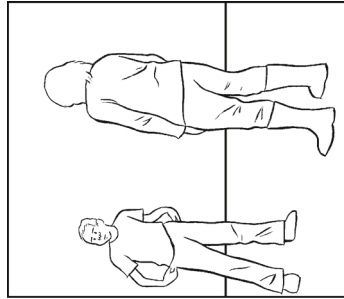
(8) 11:06–11:09 Kyle initiates repair: looks, orients forward, RH relaxes knees, sways to her right slightly



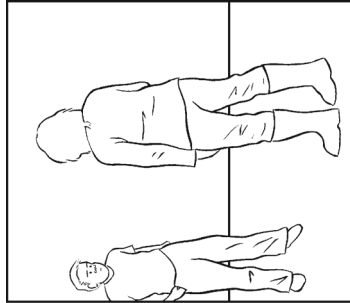
(9) 13:03 Kyle steps toward RH, and begins to sway to his right; RH continues slight sway to her right



(10) 13:05–13:06 Kyle sways to his left, lifts arms; RH shifts to sway to her right to mirror him



(11) 14:02 Kyle and RH are in a full mirrored sway; Kyle's hands move to pockets, he looks to his right



(12) 15:00 Kyle looks at RH, hands in pockets; both sway mirrored and synchronized: Repair

Fig. 1 continued

At this point, I begin to expand my movements. In retrospect, it appears that this change does not take into account Kyle's bodily or emotional state. He seems content with the smaller swaying we are doing. It may be that my inexperience results in a reticence to stay with Kyle's movement "mood." Perhaps I become insecure, worrying that I have been repeating the same movement for too long, or that I am not doing enough. Kyle and I then enter an extended mismatched period. I continue to seem unaware that Kyle is maintaining the simple sway, his hands still in his pockets, and his body language relatively neutral.

Upon looking closely at the video in 1/10th seconds, Kyle's discomfort is manifested in his glancing away intermittently and moving his hands around in his pockets. I sway in larger arcs, moving my head, raising and lowering my shoulders, stretching my arms wider and higher, bending my knees more deeply, and exaggerating my back movement. Kyle at first tries to participate in our connection by maintaining his small swaying movements. But as my movements become bigger and more energetic, Kyle's sways become smaller. At second 32:05, I begin shaking my hands and moving my fingers. Making an effort to stay with me, Kyle pulls his hands out of his pockets and wiggles his fingers for a second. At the same time, he looks further away to the side and steps back. The increased energy and size of my movements are creating a disruption. For another second, he moves his hands again and takes another step back. The time elapsed is now 34:07 s.

For about 10 s I continue with increasingly large "approach" movements involving more of my body. While looking away, Kyle gamely continues a small sway and shakes his hands slightly. I then reach into Kyle's kinesphere. I am standing approximately three feet away from him, but my hands reach a distance of approximately two feet away from his face: I am literally "in his face." Meanwhile, I maintain constant and direct eye contact. The time elapsed is now 44:06 s.

The combination of moving into someone's personal space, and maintaining direct eye contact, is usually experienced as an intrusion, a challenge, or possibly a threat. I continued for the next 20 s to move in this high approach manner, and to remain at the edge of Kyle's kinesphere. This was a long period of time to maintain such a high arousal pattern.

Kyle responds with both approach and withdrawal movements. He moves his hands in and out of his pockets. He shifts his gaze, making and breaking eye contact. He plays with the folds of his shirt and touches his eyes and head. He turns his head toward and away from me. He moves his body closer to me and then farther from me. Because all these movement responses to me occur at a three-foot distance, we can infer that Kyle's personal space is about three feet around him. Although my arms and hands have entered his kinesphere, and he is clearly agitated, Kyle is able to continue our familiar movement pattern of small swaying throughout this period. This is a period of time in which my large movements seem to represent my efforts to persuade Kyle to move with me. While he is struggling with my large movements at the edge of his kinesphere, remarkably he is still able to stay connected through his sway and intermittent eye contact. The time elapsed is now 67:00 s.

At second 67:01, I reach my arms out to the side, making my body even larger and taking up more space. Kyle looks at me, looks away, and then looks back at me. He steps back, crosses his arms, and then takes a wide stance. He seems to be

saying, “Okay, what are you doing? I need some space, and you need to figure this out.” The sum of the time elapsed is now 70:05 s.

The second set of drawings below, Fig. 2, illustrates the next 9.4 s. These drawings represent the conclusion of the 80 s analyzed.

Comments on Figure 2

In the first drawing of this sequence (70:05), I am reaching my arms straight above my head. As Kyle watches me, with his arms still folded, he leans slightly to his right. He continues to make eye contact and maintains his wide stance. By drawing 2 (72:07) in Fig. 2, Kyle has taken two more steps back, looked away to his left, and leaned again to his right. Because I have also leaned to my right, and we have turned our torsos to face one another, our bodies are still oriented to each other. It is a conflicting message that we are facing each other, but moving in opposite directions. Perhaps by giving himself this extra space, Kyle is able to stay partially engaged. From drawings 2 to 3 (72:07 to 73:08), Kyle looks back at me, leans slightly toward me, and points his right index finger. These movements represent an approach; the straightened finger conveys tentative openness.

When he opens his finger, I lower my right palm. Perhaps each of us feels a little more open to the other. Both of us lean in the other direction, to our own left side, remaining oriented *en face* (facing each other). This repetitive rhythm of opposite-direction leaning movements, which enable us to stay oriented toward each other, is a variation on a pattern from earlier in the session and from previous sessions. Kyle’s maintenance of this rhythm is one of his ways of staying connected. Kyle does not stop participating; he stays very involved. Importantly, I was able to recognize this contribution of Kyle’s only after I had performed a microanalysis of the video.

From drawings 3 to 4 (73:08 to 74:08), I maintain my large, high-energy turns movements. However, my hand gestures are ambivalent: my right palm turns inward, an inviting gesture, but my left palm turns outward, a “stop” emblem. Kyle remains oriented *en face*, looking at me, and continues in the swaying rhythm with me. Again, each of us has swayed to our other (opposite) side, remaining *en face*. This is our way of staying in contact. But his arms are folded and he has tucked his finger back in, conveying a boundary. The swaying movements are a thread that binds us throughout this time. However, while we stay partially in tune with each other, his stance and folded arms seem almost like a challenge.

From drawings 4 to 5 (74:08 to 76:00), I continue the swaying, facing Kyle head-on, and I stretch my torso up and toward him. I am available for connection. Kyle continues to sway slightly, but he maintains his distance. Although I do not match his sway in size, direction, or timing, I am also swaying. My hands continue to convey a mixed message: my right hand reaches toward Kyle, and my left hand gestures to the side.

Critically, at drawing 5 (76:00), I hold my sway so that Kyle catches up to me, such that we are mirroring each other, as opposed to swaying diagonally across from each other. Swaying in opposite directions, as above, required a turning of the torsos to remain *en face*. When we switch to mirroring each other, we are experiencing the other’s movement as if seeing oneself in a mirror. Our sway rhythms continue to

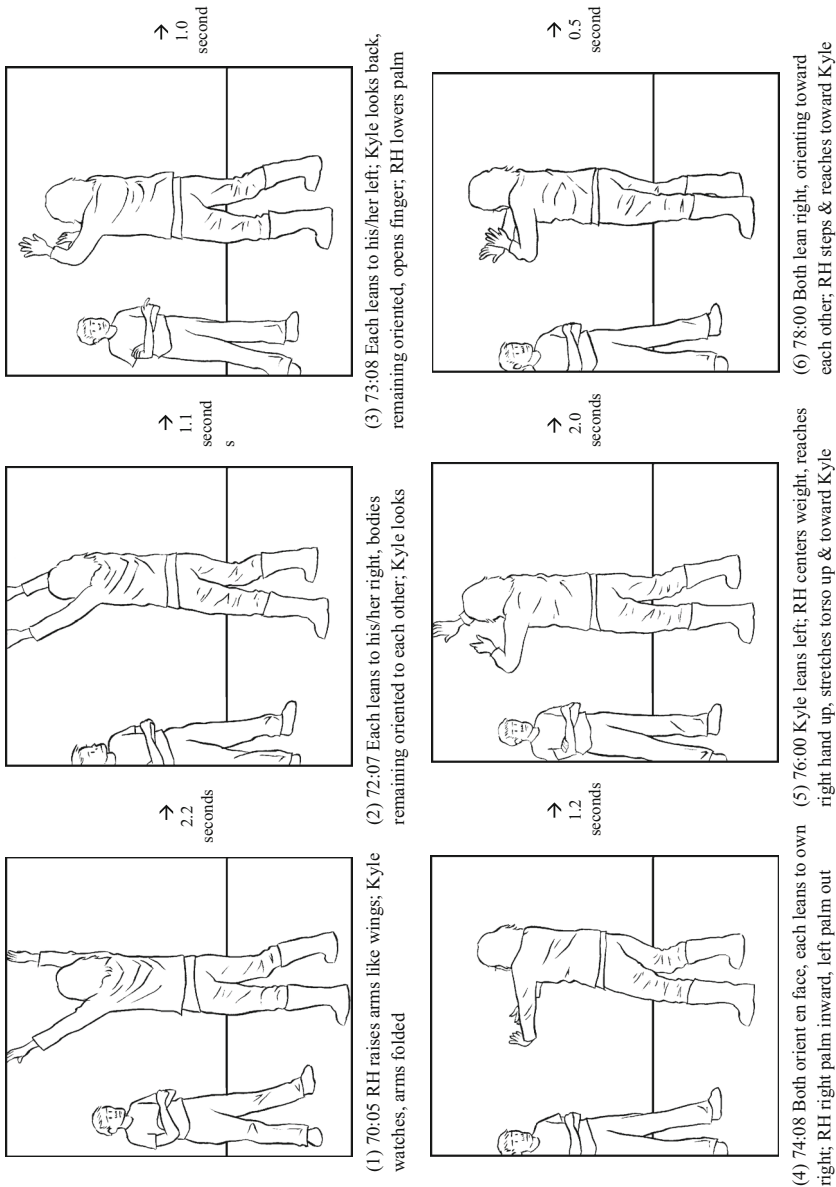


Fig. 2 Disruption and repair: clapping and coming together. Frame-by-frame analysis of 9.4 s (70:05 to 80:00)

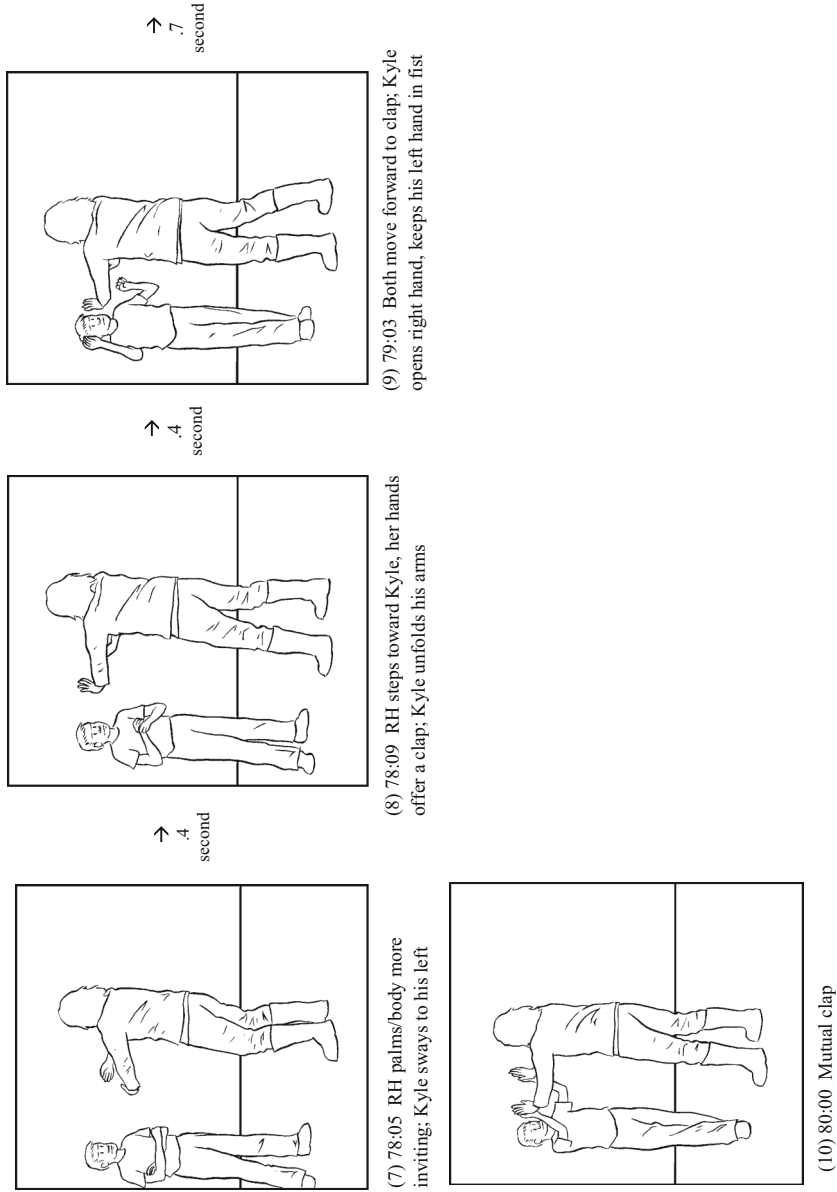


Fig. 2 continued

match. In drawing 6 (78:00), I lower my arms and step toward Kyle. I stay centered, communicating that I am inviting him to meet me. From drawings 6 to 7 (78:00 to 78:05) I become more open to Kyle. I take a second step toward him, my right palm stretches toward him, my torso curves and softens, and my knees soften so that I am more at Kyle's level. For his part, from drawings 6 to 7 (78:00 to 78:05), Kyle sways back slightly to his left, and he becomes more directly centered vis-à-vis. Throughout drawings 2–7 (72:07 to 78:05), Kyle keeps swaying and maintains eye contact.

From drawings 7 to 8 (78:05 to 78:09), I step with my left foot toward Kyle and I offer my open palms to him, indicating that we might clap hands. In this moment I cross an invisible boundary and enter Kyle's own physical space. He stays vis-a-vis and begins to uncross his arms. Remaining in this closer physical space, and uncrossing his arms, is important here. Kyle does not move back, as he might well have. And his arms have been folded since the beginning of this period so that their relaxation here constitutes an important shift. However, he holds his hands together, still tentative. As I lift my leg to step toward Kyle, and reach my arms and palms out to him, he moves his right leg and begins to step toward me. This is a split-second coordination (within 0.4 s). Our leg movements mirror each other (his right, my left). Then, from drawing 8 to 9 (78:09 to 79:03), Kyle reaches his arms toward me and lifts his torso up toward me, with his palms facing me. Simultaneously I reach to him with open palms and lift my torso as well. From drawing 9 to 10 (79:03 to 80:00), we continue to move toward each other with synchronous and mirrored stepping (his right foot, my left foot). We have taken two steps in the 0.6 s intervening between drawings 9 and 10. Then, quite remarkably, our hands meet in a clap! We have made an important repair. It seems that we both feel comfortable with this contact and connection, and our relationship is building.

Thus, the story that is told in Fig. 2 is a 9.4-s story about my working hard to make a connection, Kyle's remaining closed in his folded arms posture but continuing to stay involved by swaying in a coordinated rhythm with me, and finally, our mutual physical connection through the clap. While there are moments when I push Kyle to respond, he has stayed with me, facing me and continuing to make eye contact, while simultaneously expressing his discomfort. In our movement "conversation," I speak with more volume and speed than Kyle, with my large and exaggerated body movements, but he keeps "listening" and getting "a few words in" edgewise. When he is overwhelmed, he uses his body orientation, gaze direction, and hands to establish and communicate boundaries. My consistent and insistent movements communicate my unwavering involvement and commitment to him. Together, through our movements, we co-create the repair.

The narrative and Figs. 1 and 2 above capture the beginning of Kyle's and my DMT session. Without the ability to communicate verbally or maintain social relationships in other situations, Kyle is able to stay engaged with me and to communicate his feelings and needs. Using video microanalysis, I see that his movements reveal his state of mind, microsecond by microsecond. In fact, I see that, although I disrupted the connection in several ways, Kyle kept coming back and finding ways to stay connected. I also see that I was able to establish enough safety and personal connection throughout the 80 s that ultimately Kyle stuck with me, and that eventually we created the exciting moment of coming together with the clap.

Discussion

This article reflects an exploration on three levels. First, it shows that video microanalysis can provide dance/movement therapists in training a new skill of movement analysis. By learning about video microanalysis, RH was able to employ a sophisticated tool for seeing and understanding the movement conversation between her and her client during their DMT session. Second, the article documents how microanalysis can illuminate the capacities of the client and the therapist. Indeed, microanalysis of this case study revealed the nonverbal communication abilities of this adolescent diagnosed with Autism Spectrum Disorder, as well as that of this beginning dance/movement therapist. Finally, microanalysis is shown to be a powerful tool for the DMT profession, in both clinical work and training.

Microanalysis was a remarkable resource for me (RH) to learn to see my client and myself, and to think differently about my work. I was astonished by the split-second coordination and reciprocal responsiveness of our movements. By learning to identify micro-movements, I began to see how Kyle and I co-created a relationship, and in ways I had neither been aware of at the time, nor when I had watched the video in real time, nor even in slow-motion. This process enabled me to view my own work as a dance/movement therapist with new clarity and respect.

In order to perform microanalysis, I had to learn first to recognize the moments that captured the maximum change points in the interaction between my client and me. In this process I learned to notice changes in movements *across* two frames, rather than viewing each frame as a static image. Seeing movement in this detailed fashion taught me about ways that two bodies may communicate—ways that I had not previously appreciated. In preparing the drawings for publication, and particularly in my effort to describe needed refinements to the illustrator, I was surprised that I found myself learning to see in the movement patterns progressively deeper layers of what was happening.

Microanalysis thus offered a new perspective on the movement conversation between RH and Kyle, an adolescent with Autism Spectrum Disorder. He was remarkably communicative and coordinated in his movement conversation with RH, and his split-second timing was similar to that of RH. He withdrew at appropriate moments, for example, when RH invaded his personal space. Despite several disruptions introduced by RH, he was able to remain in various forms of movement coordination, such as swaying, a movement that he repeated from previous sessions. In addition, he often initiated movement patterns that led to greater connection with RH. Without this detailed microanalysis, Kyle's ability to read behavior and coordinate at the micro-momentary level, and his remarkable capacity to persevere and to initiate contact after disruptions, would not have been apparent. For her part, as a dance/movement therapist in training, RH was able to stay related to Kyle through her movement coordination and eye contact, to create a safe environment that allowed him to stay engaged in the session, and to lead him ultimately to a therapeutic connection in the moment of clapping. Through the microanalysis process, RH was able to see her own micro-disruptions of the connection, and her missed opportunities for connection. She discovered moments when she had

withdrawn from Kyle at critical points in their interaction. Even so, microanalysis of her session overall showed RH that she had created a therapeutic environment. She could see with her own eyes the ways in which she and Kyle co-created their movement conversation and thereby developed modes of a connection that might allow transformative work to occur in the future.

Disruption and repair was a recurrent theme across the 80 s. One dimension of the therapeutic action illustrated by this microanalysis is the generation of expectancies of repair in both partners. It is striking that repairing disruptions is a pervasive interactive skill for infants, and this adolescent with autism seems to have retained this skill at the movement coordination level.

The application of microanalysis to a DMT dyad may afford both experienced and beginning dance/movement therapists an alternative lens with which to see DMT's inner-workings. Microanalysis can benefit the DMT community in both training and research. Indeed, the movement process of micro-changes, minute disruptions and repairs, moments of falling apart and moments of coming back together, occur in every kind of therapeutic interaction, and in every relationship. If we take the time to dissect the moment-by-moment movement process, we will learn more about therapeutic action. For clinicians of all kinds, this is a wide-open field that has barely been tapped.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflicts of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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