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## Dancing supports empathy: The potential of interactional movement and dance for psychotherapy

### ABSTRACT

This article provides an overview of the conceptualization and implementation of our manualized dance and movement intervention with the aim of fostering kinaesthetic, cognitive and emotional empathy through interactional movement and dance. In the first part of this article, the essential role of kinaesthetic empathy in an embodied concept of empathy and in dance and movement therapy (DMT) is described. The neurobiological grounding of kinaesthetic empathy in simulation processes, the modulation of simulation and the self-other distinction are outlined, as well as possible relations of empathy with sympathy and prosocial behaviour. The second part of the article focuses on the development of our imitation- and synchronization-based intervention ("Moving in and out of synchrony": Behrends, Müller, & Dziobek, 2012). We provide arguments for choosing imitation, synchronization and embodied cooperation, complemented with elements of self-expression and self-perception, for the intervention. Conceptualization of the first realization of our intervention with adults on the autism spectrum, a controlled proof of concept intervention study (Koehne, Behrends, Fairhurst, & Dziobek, 2015), is summarized. Contents and implementation of the intervention are described in the third part of the article. Our approach to the development and implementation of dance and movement sessions as well as summarized session contents are outlined. Additionally, we show excerpts of our observations and participants' feedback in sessions, closing with a discussion and outlook on suggested further adaptation and evaluation for different therapeutic indications.

**Keywords:** interactional dance and movement – imitation – synchronization – kinesthetic empathy – self-other distinction – autism – intervention study – therapeutic potential

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## Introduction and outline of the article

Dance is a truly unique and direct form of communication.

Dance is a unifying activity involving the whole self.

To dance is in the deepest sense of the word to *be* more vividly.

*(Rosa Shreeves, choreographer and dance movement therapist, 2006, p. 232)*

Movement validates and gives expression to an “I” ... in the sense of agency, of capability, hence in the sense of a kinesthetic/kinetic reality. Movement is indeed the basis of our experience of ourselves as capable and effective agents in the world: we can do things, accomplish things, make things happen.

*(Maxine Sheets-Johnstone, philosopher, 2010, pp. 5–6)*

Dance and joint movement have always been a means to connect people and at the same time can support awareness of oneself. Dance can be a medium through which to express and perceive one's own mental-emotional state as well as a way of attuning to and communicating with other people. In particular, moments of synchrony with others can make us feel close and connected. In social interactions, unconscious tuning in to each other's movements or gestures happens through imitation and interpersonal movement synchronization (Chartrand & Lakin, 2013; Lakin, Jefferis, Cheng, & Chartrand, 2003). In a broader interpersonal context, empathic attuning to other people's emotions and needs in movement, feeling and thought is a crucial component in human social interaction. This article provides a rationale for why, in our view, interactional dance and empathic attuning to other people have a close connection with each other, and why interactional dance and movement can convey understanding of others and foster group cohesion.

Our project was realized at the interdisciplinary research centre “Languages of Emotion” at Freie Universität Berlin between 2009 and 2014 and was constituted as an interdisciplinary research project. We were able to provide input from psychology, dance/choreography and dance education, child and adolescent psychiatry/psychotherapy and dance and movement therapy, with additional comments from dance studies and music therapy. Our approach is founded on the conceptualization of empathy and prosocial behaviour as embodied interpersonal processes that are crucially based on bodily-kinaesthetic perceptions and coordinated action. In order to foster empathy, we have developed an interactional dance and movement intervention based on the main elements of imitation, synchronization and embodied cooperation, including tasks to promote self-other differentiation and with a transfer to everyday life. As a basis for new interactive dance and movement experiences, we aimed at supporting a positive experience of movement and dance in our sessions, and at strengthening self-expression in movement. Our intervention realizes a combination of manualized dance and movement sessions based on a theoretical foundation (“Moving in and out of Synchrony”: Behrends et al., 2012) together with an integrative stance in realization of group sessions (experience-oriented, therapeutic, dance pedagogic and artistic).

This article provides an overview of the central ideas of our research concept. In the first theoretical part of the article, we outline our understanding of embodied empathy processes. The second part focuses on the development of our imitation- and synchronization-based dance and movement intervention. In the third part we describe our approach, contents and experiences concerning the implementation of our intervention, followed by a discussion that includes an outlook on suggested further adaptation and evaluation of the intervention contents. The results of quantitative analyses of objective tests of our controlled proof of concept intervention study have been described elsewhere (Koehne, Behrends, et al., 2015). An extensive outline of the intervention itself, including manualized session contents and more session observations, as well as feedback from participants and resulting adaptations, will follow (Behrends et al., in prep.).

## Part I: Embodied Empathy

### **“Embodied” Empathy: Kinaesthetic, emotional and cognitive facets of empathy**

#### **Emotional and cognitive empathy: “feeling and thinking with someone else”**

Although the construct of empathy has been researched and discussed from various disciplines, including philosophy, behavioural psychology, psychiatry, arts and dance studies, until now empathy has no universally accepted definition and conceptualizations of empathy vary widely across disciplines and publications (see, for example, Blair & Blair, 2009; de Vignemont & Singer, 2006; Foster, 2011; Lamm, Batson, & Decety, 2007; Singer & Lamm, 2009; Zahavi, 2001). Most authors agree that empathy is a multidimensional construct. Some authors emphasize the emotional or affective response in empathy, whereas others focus more on the associated cognitive processes. Kinaesthetic aspects, although in our understanding a crucial component of empathy, have only recently regained increasing research interest.

Emotional aspects of empathy, broadly defined, comprise all vicarious emotional responses to the perceived emotional experiences of others (Mehrabian & Epstein, 1972), including phenomena such as emotional contagion, empathic concern, and personal distress. In a more narrow definition, emotional empathy is conceptualized as emotion mirroring, i.e. sharing the feelings of another person (Preston & de Waal, 2002). The term “emotional empathy” is thus used as an umbrella term and more specific terms should be used when referring to specific subcomponents. “Cognitive empathy” can also be understood as an umbrella term, referring to processes that enable us to understand and interpret the emotions, thoughts and intentions of another person, such as perspective-taking and inferring of mental states, also referred to as Theory of Mind (ToM: Amodio & Frith, 2006). The concept of cognitive empathy has strong overlaps with the concept of mentalization, founded on developmental-psychological and

psychoanalytical backgrounds (Allen, Fonagy, & Bateman, 2008; Fonagy, Gergely, Jurist, & Target, 2002). Emotional and cognitive empathy can be developed to different degrees, separately assessable through the Multifaceted Empathy Test (Dziobek et al., 2008).

### The kinaesthetic “roots” of empathy

When we see a human body moving, we see movement which is potentially produced by any human body, and therefore by our own... through kinesthetic sympathy we actually reproduce it vicariously in our present muscular experience and awaken such associational connotations as might have been ours if the original movement had been of our own making.

*(John J. Martin, dance critic, 1936, as cited in Foster, 2011, p. 7)*

The concepts of kinaesthesia and kinaesthetic empathy have been researched from various disciplines and have gained increasing interest in the context of the “corporeal turn” (Sheets-Johnstone, 2009) in humanities and human sciences. Choreographer and scholar Susan Foster researched the term “kinaesthesia” in the fields of dance studies and dance history (Foster, 2011, p. 7). As a convergence, kinaesthesia can broadly be defined as the sensation of movement and position/body posture, in a complex relationship with proprioception (Reynolds & Reason, 2012, p. 18). Even more than kinaesthesia, research on the concept of kinaesthetic empathy is an interdisciplinary approach in the context of understanding social interaction and communication. The immediate experience of watching a tightrope walker was a central example for German aesthetician Theodor Lipps’ aesthetic-philosophical remarks on the concept of “Einfühlung”. As an observer, one intuitively starts to feel as if one is balancing oneself on the rope and cannot avoid swaying from side to side whilst almost holding one’s breath. Both Vischer and Titchener, who first coined the terms “Einfühlung” and “empathy”, viewed empathy as an experience involving one’s entire subjectivity, including a strong component of kinaesthetic sensation (as reviewed by Foster, 2011, p. 127). In his early work in aesthetics “Grundlegung der Ästhetik” (1923), Lipps further developed this concept and reflected on “Einfühlung” as a holistic, interpersonal, kinaesthetically-based process, involving immediate bodily-emotional perceptions in the observing person as a kind of inner imitation (Lipps, 1923). Moreover, Lipps remarked on a close interrelatedness of “Einfühlung” with “Ausdrucksbewegungen”, meaning all forms of emotional-bodily expression of a person in the form of movements, mimicry, gestures, voice etc. In brief, the “father” of the concept of “Einfühlung” described what was later to be called empathy as an embodied, particularly kinaesthetic process.

Dance researchers with a focus on the aesthetic reception of modern dance (Foster, 2011; initially John Martin, 1936, 1939; Reason & Reynolds, 2010) used the term “kinaesthetic empathy” to refer to spectators’ muscular and emotional responses while observing dancers. They argued that through inner mimicry, spectators of modern dance could have the same sensations as if they were actively participating in the dance, thereby directly experiencing both

its movements and also the dancer's associated emotions. With a focus on the emotional experience, the concept of kinaesthetic empathy has recently been increasingly integrated in the field of psychology and psychotherapy (Foster, 2011, pp. 10–11).

In the fields of psychology and cognitive sciences, the concept of kinaesthetic empathy lost scientific attention for a long time, and emotional and cognitive components of empathy moved more into the focus of research. In the past decades, the growing interest in mirror neuron research supported a broader recognition of an embodied empathy concept, and along with it, interest in kinaesthetic empathy made a comeback. In the context of embodiment theory, researchers from different disciplines such as psychology, psychiatry, philosophy, dance studies, film, theatre, sport etc. have once again been highlighting the relevance of the kinaesthetic aspect of empathy (e.g., Foster, 2011; Fuchs & Koch, 2011; Fuchs, 2009; Reynolds & Reason, 2012).

The fact that the experience of empathy needs to be qualified with the adjective 'kinesthetic' belies the pervasive assumption that emotional and physical experiences are separate.

*(Susan Foster, choreographer and scholar, 2011, p. 10)*

In our conceptualization of empathy, we are in line with other embodiment approaches in favouring a multidimensional and embodied definition, integrating its cognitive, emotional, and corporal/kinaesthetic dimensions (e.g., Fuchs & Koch, 2011; Fuchs, 2009). Recently, the notion of embodied empathy processes has also been gaining increasing interest in psychotherapy (e.g., Ramseyer & Tschacher, 2010; Ramseyer, 2010); dance and movement therapy, and supervision; for the term "embodied empathy", see Harris (2007) and Sletfold (2015).

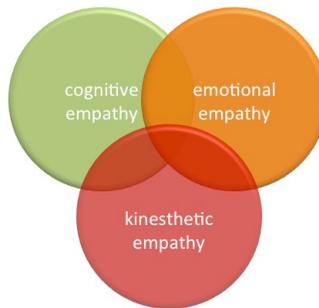


Figure 1. Subcomponents of empathy

Interestingly, in the German language, there is an evident connection of empathic feeling and understanding of another person through intuitive joint movement in the phrase "mit jemandem mitschwingen" or "sich einschwingen auf jemanden" (literally meaning to swing along/together with someone). In the English language, one can feel "out of sync" with another

person. These idioms can be seen as pointing out the spontaneous tendency to imitate and synchronize the movements of other people and thus refer linguistically to empathy as an embodied process, somewhat related to a dance. The English verb "to attune" to someone and the expression "to be in tune" with someone, related to tune/song/rhythm, similarly hint at a connection between empathic social interaction and synchrony in music and rhythm.

### **Sympathy as "feeling for someone" and prosocial behaviour**

In contrast to the narrow definition of emotional empathy as a response with the same quality, feelings of empathic concern or sympathy are emotionally incongruent phenomena that refer to feeling *for* rather than *with* someone, and imply, for example, positive feelings of warmth and compassion for somebody in distress. As one might say, empathic concern, sympathy and compassion constitute more complex other-oriented emotional reactions that will be more likely to result in prosocial and altruistic behaviour than empathy alone (Eisenberg & Fabes, 1990). In order for empathic concern to appear and to result in a feeling of sympathy and prosocial behaviour, an awareness that it is the *other* person who is in distress or in need is essential, especially when dealing with challenging emotions such as grief or pain. Otherwise, projecting oneself too much into an aversive situation can lead to an aversive distress reaction or to empathic over-arousal in the empathizer that does not lead to prosocial action but rather to withdrawal behaviour that is intended to protect oneself (Decety & Lamm, 2006; Eisenberg & Fabes, 1990). Nancy Eisenberg, who studies the relationship between empathy and prosocial behaviour in relation to the Buddhist teaching of compassion (Eisenberg, 2002), showed in an early work that not empathy as such, but an other-oriented sympathetic responding, is positively related to altruistic actions (Eisenberg & Fabes, 1990) and that "both sympathy and personal distress often result from empathy" (p.132).

### **Self-other distinction and embodied sense of self as prerequisites for empathy**

Cognitive Empathy presupposes self-awareness: Evidence from phylogeny, ontogeny, neuropsychology and mental illness. We argue that cognitive empathy and other instances of mental state attribution are a byproduct of self-awareness. Evidence is brought to bear on this proposition from comparative psychology, early childhood development, neuropsychology, and abnormal behavior.

*(Commentary by Gallup & Platek on Preston & de Waal, 2002, p. 36)*

In contrast to basic emotion-sharing phenomena such as emotional contagion, recent conceptualizations of empathy include a clear component of self-other distinction. As one definition of (emotional) empathy, empathizing happens when the observation or imagination of an affective state in another person induces shared states in the observing or imagining person (de Vignemont & Singer, 2006; Singer & Lamm, 2009). As Bernhard & Singer (2012) remark, this concept of empathy implies the knowledge that the *other* person is the source of the

affective state in the self. In consequence, abilities of self-awareness and self-other distinction can be viewed as prerequisites of empathy.

The sense of self and an intact self-other distinction are laid out at an early stage of infant development. The development of emotional and cognitive empathic skills and the ability to engage in flexible interpersonal interactions depend mainly on the quality of early attachment relationships (e.g. Fonagy et al., 2002; Stern, 2000). Stern (2000) states that the sense of self is a subjective experience that is first shaped in the infant's preverbal interactions with the caregiver, with the first medium of perception and communication in life being the tactile/motoric mode. That means that the very first interactions in the life of a human being – those that shape him most intuitively and precede verbal interactions – are sensory-physical and kinaesthetic ones.

I begin with the observation that movement is at the core of life. We come into the world moving; we are precisely not stillborn. The chronological epistemological development of all humans, their learning on all fronts, is first by movement, and then by word of mouth. In other words, infants are not *prelinguistic*, as is commonly declared; on the contrary, language is *post-kinetic*.

*(Maxine Sheets-Johnstone, philosopher, 2010, p. 2)*

In fortunate surroundings, examples of early sensory and kinaesthetic interactions can include being gently rocked and caressed to the accompanying rhythm of a lullaby, being soothed by being carried around, lying on the breast of one's mother or father and feeling the rhythmic up-and-down movement of their breath, or feeling the parent's body as a gentle boundary responding to the baby's own movements. Rhythmic interactive processes and mutual imitation between parent and child constitute a crucial role in the development not only of an implicit sense of self but also of primary intersubjectivity and expressive abilities (for a review on synchronization processes in parent-infant interaction, see Feldman, 2007b; also see Nadel-Brulfert & Baudonnière, 1982; Trevarthen & Aitken, 2001). Feldman (2007a) showed that the quality of the early attachment relationship (measured as the degree of mother-infant synchrony in the first year of life) is a direct predictor of empathic capacity and a moral stance in adolescence. Dance and movement therapists Samaritter & Payne (2013) contributed an elaborate description of the developmental-psychological development of kinaesthetic intersubjectivity, referencing many further readings. Considering the importance of kinaesthesia for the development of intersubjectivity, it might be assumed that kinaesthetic empathy possibly forms the basis for the development of more abstract dimensions of empathy.

## Neurobiology of Kinaesthetic Empathy

There are different prerequisites for embodied empathy, most notably that first, one must be able to attune to another person in different dimensions (bodily-kinaesthetically, emotionally

and cognitively) and, second, one must have a sufficient self-other distinction, in order to identify the other person as the source of one's feelings.

### **Attunement**

It has been suggested that the neural mechanism underlying attunement to another person relies on the so-called mirror neuron system (Gallese & Goldman, 1998; Rizzolatti & Sinigaglia, 2010). Located in the inferior frontal gyrus and parietal areas, neurons in this system have been shown to fire both when a specific action is observed and when this same action is carried out (Van Overwalle & Baetens, 2009). By way of simulation, this mechanism has been hypothesized to enable imitation of movements and also empathic functions (Oberman & Ramachandran, 2007). Today, the neural mechanism of simulation has been shown to be a more general mechanism implemented in a wide range of brain areas going beyond the original mirror neuron system. For instance, it has been shown that watching another person experiencing a painful stimulus activates the same emotion processing brain areas as the first-person experience of that painful stimulus (Singer et al., 2004). However, the mirror neuron theory of social cognition has been criticized repeatedly (Van Overwalle & Baetens, 2009) and more research is needed to clarify the role of mirror neurons in social functions.

### **Self-other distinction**

In contrast, a more recent line of research suggests that simulation as it is implemented in mirror neurons can be detrimental to cognitive empathy – i.e., the understanding of others' mental states – and thus needs to be *inhibited* (Brass, Ruby, & Spengler, 2009). These authors suggest that blurring the boundaries between self and other leads to the projection of one's own mental state onto the other, causing egocentric bias (Santiesteban et al., 2012). This would be particularly relevant in situations in which one's own mental state is very different from the other's, requiring one to pull away from one's own view to take the other's perspective. Evidence from neuroscientific studies suggests that the *inhibition* of the mirror neuron system through brain areas related to self-other distinction (midline structures and the TPJ) is related to enhanced perspective-taking. The same brain areas are activated when individuals inhibit the automatic tendency to imitate an observed movement, underlining the association of simulation inhibition and self-other distinction.

### **Modification of attunement and self-other distinction through movement experience**

Previous research has demonstrated that both simulation and simulation inhibition can be modified by movement experience (Calvo-Merino, Glaser, Grèzes, Passingham, & Haggard, 2005; Calvo-Merino, Grèzes, Glaser, Passingham, & Haggard, 2006; Santiesteban et al., 2012). Supporting the variability of simulation, it was shown that sensorimotor experience and previous training play a critical role in the development of simulation/automatic imitation (Catmur, Walsh, & Heyes, 2009). For instance, the probability of simulating an observed action (often in

a subtle and unconscious way) is higher for internalized movements (e.g., Ballet dancers watching Ballet movements) than for new movements (Ballet dancers watching Capoeira movements: Calvo-Merino et al., 2005). In support of the variability of simulation inhibition, it was shown that a brief imitation inhibition training increased the ability to inhibit the automatic tendency to imitate and also visual perspective-taking abilities (Santiesteban et al., 2012).

## Kinaesthetic Empathy in Dance and Dance Movement Therapy

### Social bonding and self-expression in dance

Without needing proof from neurobiologic research, dance and joint music-making have always brought people together and traditionally created communion between people. Moving in synchrony appears in many group rituals (e.g. traditional circle dances or rhythmic drumming) and can both strengthen existing bonds, such as those within tribes or among friends, and help to connect formerly unknown people to each other. Historian William H. McNeill (1995) and anthropologist Barbara Ehrenreich (2006) both maintain that synchronous movement, as in group rituals, is the most widespread and powerful biological cooperation-enhancing mechanism. Dance also has an expressive function, which can be experienced in the dance styles of different cultures, such as African dances, Flamenco and Modern Dance. Improvised interactional dance styles combine the realization of both above-named elements of dance, namely both the experience of moving in synchrony with another person (in a mirroring or complementary form) and the input of one's own personal movement expression in the form of variation and contrast, with an experience of self-efficacy and self-expression. Examples of interactional dance styles of this kind are improvised dance duets in Contact Improvisation, Tango Argentino and Capoeira (a combination of martial art, acrobatics and dance) that build on and refine kinaesthetic empathy processes to a high degree (for a study on empathic functions in Tango Argentino and Capoeira dancers, see Koehne, Schmidt, & Dziobek, 2015. For Tango Argentino increasing mindfulness and reducing depression, see Pinniger et al., 2012).

Certainly much of the improvisation within forms such as Contact Improvisation and Capoeira plays with the joy of physical moments of synchrony as well as the very real pleasure of interrupting that connectedness.

*(Ann Cooper Albright, dancer and scholar, 2003, p. 262)*

### Dance and movement therapy (DMT)

There is a *generative* as well as *expressive* relationship between movement and emotion.

*(Maxine Sheets-Johnstone, philosopher, 2009, p. 199)*

Dance and movement (psycho-)therapy (DMT or DMP) represents a form of embodied psychotherapy for a broad range of neurotic, psychiatric and psychosomatic conditions for all age groups, also supporting healing processes in many somatic illnesses (see, for example, Chaiklin & Wengrower, 2009; Payne, 2006; Willke, 2007). Through different approaches and methods (Bräuninger, 2014), DMT enhances kinaesthetic and emotional perceptions as well as expressive and social-communicative skills. As a central concept in DMT, the therapist makes use of her or his body in order to empathize with and enter into interaction with the client through partly experiencing, and sometimes also partly adopting and expressing, his or her presented posture or movement qualities. Recognition and application of kinaesthetic empathic processes has been considered as one of the major contributions of DMT to psychotherapy (Fischman, 2009; Sandel, Chaiklin, & Lohn, 1993; Schoop & Mitchell, 1974; Tortora, 2014). Within the context of embodiment research, DMT as an embodied and enactive form of psychotherapy (Koch & Fischman, 2011) has been gaining even more interdisciplinary interest and input, e.g. from philosophy/phenomenology (Fuchs & Koch, 2011).

Concerning empirical research on the effects of DMT and dance on different health-related psychological outcomes, Koch et al. (2014) recently presented a comprehensive meta-analysis. Positive effects of DMT on empathy skills and prosocial behaviour have been described in studies and case reports, such as reduction of aggressive behaviour and improvement of social skills (Hervey & Kornblum, 2006; Koshland, Wilson, & Wittaker, 2004), improvement of empathy in Arab and Jewish teachers (Gordon-Giles, 2011), increase in group cohesion in children in an inpatient psychiatric unit after DMT (Erfer & Ziv, 2006), and reports of the implementation of DMT in prison as helpful on individual and group levels in creating positive self-awareness, moments of joy and group cohesion (Milliken, 2002).

## **Part II: Development of the Imitation- and Synchronization-based Dance and Movement Intervention (“Moving in and out of Synchrony”) for Individuals on the Autism Spectrum**

### **Choice of interactional movement elements with effects on emotional and cognitive empathy and prosocial behaviour: Imitation, synchronization and embodied cooperation**

In the first stage of our research project, we reviewed existing literature in order to identify elements of coordinated movement and dance for which evidence has been found to foster both empathic abilities and prosocial dynamics such as affiliation and group cohesion and/or prosocial behaviour (Behrends et al., 2012). Three elements of interpersonal movement coordination were identified as effective for this purpose, namely imitation, synchronous movement and embodied cooperation.

*Imitation* or mimicry refers to behavioural matching that can be done intentionally, but mostly happens unintentionally as a non-conscious part of communication (Lakin et al., 2003). It is central for the development of feelings of liking and bonding between communication partners and therefore has been called a “social glue” (Chartrand & Lakin, 2013; Lakin et al., 2003). It has repeatedly been shown that imitation of, for example, gestures and facial expressions entail positive social consequences including liking, emotion recognition, generosity, and reduced racial prejudice (Dimberg, Thunberg, & Elmehed, 2000; Inzlicht, Gutsell, & Legault, 2012; Stel & van Knippenberg, 2008; Van Baaren, Holland, Steenaert, & van Knippenberg, 2003). For a recent review on spontaneous imitation/behavioural mimicry, see also Chartrand & Lakin (2013). In the definition as applied in our movement tasks (Behrends et al., 2012), imitation means first observation, and then, with a time delay, the intentional reproduction of a given movement by another person as exactly as possible.

*Synchronous movement or interactional synchrony* is mainly referred to as interpersonal coordination of similar or even different movements by two or more persons in the dimension of time (Hove & Risen, 2009; Lakens, 2010). In our definition, as applied in the intervention, it refers to a special case of imitation with additional matching in time (Behrends et al., 2012). In many different research contexts, including synchrony in joint music making, it could be shown that synchronization of movements between people increased affiliation, group cohesion and prosocial behaviour, such as the tendency to cooperate (Kirschner & Tomasello, 2010; Kokal, Engel, Kirschner, & Keysers, 2011; Valdesolo, Ouyang, & DeSteno, 2010; S. S. Wiltermuth & Heath, 2009). Nonverbal synchronization of movement is a crucial therapeutic tool to build therapeutic relationship and enhance social interactive abilities for clients in music therapy and DMT (see, for example, Berrol, 2006; McGarry & Russo, 2011; Sandel et al., 1993; Schumacher & Calvet, 2008).

*“Embodied cooperation”* (Marsh, Richardson, & Schmidt, 2009) in the sense of “bodies and minds moving together” (Sebanz, Bekkering, & Knoblich, 2006) refers to two or more copresent individuals in motion who coordinate their actions in space and time in order to achieve a common goal. According to Valdesolo et al. (2010), this requires a dynamic detection and appropriate response to one’s partner’s movements. From our point of view, embodied cooperation with a common goal can be viewed as a more complex form of synchronization, in the sense of having the same idea/goal while moving. In partner dances, embodied cooperation in the form of coordinated moving together with a common goal such as moving into the same direction or performing a joint turn happens very often, frequently in a complementary mode such as in leading and following. We also included cooperation tasks in our intervention, though to a lesser extent than imitation and synchronization.

### **Importance of contrast and modulation**

While we focused on fostering empathy with a potential to serve prosocial interactions through the practice of synchronous movement and dance, potentially detrimental effects of synchrony

also need to be considered. A pure practice of interpersonal movement synchronization as applied in, for example, military contexts, can lead to a resolving of the self and as a consequence to higher compliance with destructive obedience and requests to aggress (S. S. Wiltermuth, 2012; S. Wiltermuth, 2012). In dance therapeutic discourse, the application of therapeutic mirroring, pivotal as it is for therapeutic relationships and the fostering of social interaction quality in clients (e.g., Berrol, 2006; McGarry & Russo, 2011), has also been discussed critically in favour of a rather sparse and varied use, due to the potential of hyperimitation to lead to aversive reactions in interaction partners (Chace, 1993; Willke, 2007). In addition, it has recently been shown that imitation practice can be detrimental to the understanding of others' mental states, and, especially if inferring mental states that are different from one's own, that it leads to inaccurate answers (Santiesteban et al., 2012).

On the nonverbal level of flexible social interactions, modulation and adaptation of bodily expressions in particular are of essential importance: these are processes which in autistic people often do not happen as intuitively as in non-autistic individuals. In the conceptualization of our dance and movement intervention, it was thus essential for us to modulate the degree of imitation and synchronization in tasks continuously by integrating variation, turn-taking and contrast in joint movement in every session.

### **Self-expression and self-perception**

Die Kontaktaufnahme zum Ich, das Wieder-In-Besitz-Nehmen der eigenen Leiblichkeit, ist Voraussetzung, um den Kontakt nach außen herstellen zu können. Denn der Grad der nach innen gerichteten Spürfähigkeit entscheidet über die Resonanzfähigkeit im zwischenmenschlichen Kontakt.

Getting into contact with the "I", the re-gaining of the ownership of one's own corporeity, is a prerequisite for being able to create a contact with the outside, for the degree of the inward-oriented sensing ability decides on the ability to resonate in the interpersonal contact.

*(Ursula Schorn, dance movement and gestalt therapist, 2005, translation: A.B.)*

In social relationships, a flexible sharing of feelings requires both recognizing the body of another person as an expressive unity and the coordination of one's own nonverbal expression, such as emotion-congruent gesture and posture (Krueger, 2010). From a dance pedagogic and dance therapeutic point of view, the experience of oneself performing movements formerly unknown or not yet attended to is an essential process in expanding one's movement repertoire and expression in movement. Since an efficient body schema has been suggested as being necessary for understanding the actions of others (Decety & Sommerville, 2003) and self-perceptive abilities are often impaired in individuals on the autism spectrum (Samaritter & Payne, 2013), we chose to integrate some simple self-perceptive tasks at the end of sessions. Neurobiologically, it was remarked that resonating with an observed movement is more likely if it has been internalized from one's own repeated experience, so we argue that in addition

to attunement skills, an individual's movement repertoire and self-perceptive skills build a relevant foundation in an embodied concept of empathy. They support the individual both to express him- or herself nonverbally and to perceive and interpret his or her own and other people's nonverbal behaviour in social interactions.

### **Individuals on the autism spectrum as the target population for the interactional dance and movement study**

Having established the hypothesis to promote embodied empathy through interactional movement elements, we decided to target the first implementation of the intervention to individuals on the autism spectrum. Autism spectrum disorder (ASD) or, as preferred here in line with some authors (e.g., Baron-Cohen et al., 2009), in more neutral language, autism spectrum condition (ASC), refers to an aetiologically and clinically heterogeneous group of developmental disorders characterized primarily by pervasive qualitative impairments in social interaction and communication (American Psychiatric Association, 2013). The spectrum ranges from severe cases of intellectual impairment and total lack of language to highly talented and verbally skilled. Strengths of individuals on the autistic spectrum can often be found in systemizing and analyzing as well as inferring rules (Baron-Cohen & Belmonte, 2005).

#### **Empathy in individuals on the autism spectrum**

Attunement capacities, cognitive empathic processes and self-perception have been described as atypical in ASC. For example, most individuals with Asperger's syndrome show emotional arousal in response to intense emotional states of others, but have problems with the correct interpretation and labelling of emotions as a cognitive empathic process (Dziobek et al., 2008). As Samaritter & Payne (2013) point out, due to innate atypical resonance to the attuning environment by infants with ASC, atypical attunement patterns in the dyadic dialogue and altered use of spontaneous gestures develop over the course of development. The authors reason that as a result, in individuals with ASC, self-perception is not anchored in embodied experiences in the same way as in non-autistic development. Thus, although primarily cognitive empathic skills have been shown to be impaired in individuals on the autism spectrum (Baron-Cohen, 1997; Dziobek et al., 2006, 2008; Frith, 2001), additional problems might exist in emotional and kinaesthetic empathic functioning.

#### **Imitation and modulation of imitation in individuals with ASC**

It has been shown repeatedly that individuals with ASC have difficulties in imitation (L. A. Edwards, 2014; Seveler & Gillis, 2010), which led to the so-called "Broken Mirror Theory" (BMT) of autism (Ramachandran & Oberman, 2006). The BMT suggests that a deficient mirror neuron system impairs simulation processes, which are said to underlie the social deficits experienced by individuals with ASC. In line with the BMT, it was shown that a focused imitation

intervention effectively enhanced social-emotional functioning in young children with autism (Ingersoll, 2012). However, empirical evidence examining the BMT has produced mixed results, with as many studies reporting typical mirror neuron structure and function in ASC as those finding impairments (Hamilton, 2013). Today, several studies speak against a mirror neuron dysfunction *per se* and rather suggest that the top-down modulation of mirroring functions is deficient (Sowden, Koehne, Catmur, Dziobek, & Bird, 2015). In addition to imitation deficits, reduced spontaneous synchronization and difficulties voluntarily synchronizing with another person have recently been reported for individuals with ASC and have been suggested to also contribute to their problems in social interaction (Fitzpatrick, Diorio, Richardson, & Schmidt, 2013; Gowen & Miall, 2005; Ingersoll, 2008; Marsh et al., 2013). However, associations of synchronization with social impairments have not been investigated directly in individuals with ASC. An alternative approach suggests that rather than imitation, imitation *inhibition* is impaired in individuals with ASC (Spengler, Bird, & Brass, 2010). Indeed, hyperimitation is in line with some symptoms of ASC, such as echolalia. On the neural level, this alternative approach suggests that it is top-down modulation of the mirror-neuron system through self-other differentiating brain areas that is deficient in ASC, rather than the function of the mirror neuron system *per se*.

### Motor challenges in individuals with ASC

So ziemlich jede Bewegung, die so 'n gewissen Rhythmus abverlangt ...oder [bei der ich] interagieren soll, das ist auch immer bisschen schwierig... ich muss die Bewegung kontrollieren, weil sie nicht intuitiv von selbst kommt.

Almost all kinds of movement that require a certain rhythm... or by which I am supposed to interact with, (that) is always somewhat difficult, too... I have to control the movement because it does not come intuitively on its own.

*(Voice of an autistic participant being interviewed on movement experience  
in daily life at start of study, translation: A. B.)*

Many participants in our study reported challenges in coordinated movement with relevance in everyday movement and in sports contexts, of which some individuals are aware in the form of unpleasant memories as early as sports class at school (Behrends, unpublished interview material). Gillberg (1989) integrated motor dysfunctions in his diagnosis criteria for Asperger's syndrome from clinical observations, but subsequent empirical studies showed heterogeneous findings. From a meta-analysis of eighty-three studies, Fournier et al. (2010) conclude that motor coordination deficits are a variable, but cardinal feature of ASC, with pronounced problems compared to non-autistic control groups in the categories of movement preparation/planning, upper extremity motor function and gait/balance. As Sharoun et al. (2014) state from their review of literature, motor impairments are a core, but highly variable feature of ASC. Fournier et al. (2010) suggest that treatment of individuals with ASC should include "interven-

tions aimed at improving motor performances involved with motor coordination (i.e. gait and balance, arm functions, and movement planning)".

The core aim of our study was to foster embodied empathy in the intervention group and not primarily the improvement of motor skills. Nevertheless, we assumed that through consideration of possible motor impairments of participants, autistic individuals could additionally benefit from both intervention and control groups to have a chance for a new and positive experience with dance and movement.

### **DMT, mirroring and imitation with individuals on the autism spectrum**

The use of imitation and synchronization/mirroring in DMT to target social functions has a long tradition, especially in working with autistic children (Adler, 1970; Archambeau & Szymanski, 1977; M. Martin, 2014; Samaritner & Payne, 2013; Scharoun et al., 2014). In addition, research groups outside the DMT context, using a more standardized and experimental setting, have demonstrated that imitation by an adult in non-verbal autistic children can increase non-verbal engaging behaviour and physical contact behaviour (Escalona, Field, Nadel, & Lundy, 2002; Field, Field, Sanders, & Nadel, 2001). A recent seven-week intervention study with a focus on dance therapeutic mirroring, including modulation and variation (S. C. Koch, Mehl, Sobanski, Sieber, & Fuchs, 2015), showed a positive outcome on self-reported social skills in young autistic adults. In line with this, the evaluation of the imitation- and synchronization-based intervention described here yielded positive effects on empathic functions (Koehne, Behrends, et al., 2015). It has further been suggested that adults on the autism spectrum can also benefit from DMT in combination with music therapy (Mateos-Moreno & Atencia-Doña, 2013).

## **Part III: Contents and Implementation of the Imitation- and Synchronization-based Dance and Movement Intervention ("Moving in and out of Synchrony")**

### **Moving in and out of synchrony": a new imitation- and synchronization-based dance and movement intervention fostering empathy through interactional movement and dance**

The contents of the manualized intervention with more task examples, a sample session as well as participants' feedback with original quotes and resulting adaptations will be described in more detail elsewhere (Behrends et al., in prep). This section intends to provide an overview.

### Intervention study

Our empathy-fostering dance and movement intervention formed the core of an intervention study with a controlled proof of concept study design, the methods and results of which have recently been published elsewhere (Koehne et al., 2015). Adult autistic volunteers were recruited for a movement intervention announced as promoting motor functions and general physical wellbeing. Fifty-five individuals with  $IQ \geq 85$  met the inclusion criteria. Participants were kept blind to the aim of the study (with debriefing at the end of study) and were assigned to receive either ten weeks of a dance movement intervention focusing on interpersonal movement imitation, synchronization and cooperation ( $n=25$  completed intervention) or a control movement intervention focusing on individual motor coordination ( $n=23$  completed intervention). Apart from the presented dance and movement intervention, we provided another movement program in the form of mild circle training (with individual tasks such as dexterity exercises and physical endurance training) that was conducted with a similar group setting, session structure and use of music, but was kept free of tasks that involved interpersonal coordination. Comparability in the variables of age, IQ, education level and level of sporting activity was maintained between groups. Before and after the interventions, we applied different quantitative and qualitative measures in both groups to assess imitation and synchronization, emotional and cognitive empathic functions, and other variables such as mental strain, quality of life, body concept and experience of movement in everyday life. Assessments comprised standardized computer-based tests, questionnaires, a new video-based movement analysis and qualitative interviews. Participation time in sessions and assessments was reimbursed by a moderate expense allowance.

Our imitation- and synchronization-based dance and movement intervention (Behrends et al., 2012; Koehne et al., 2015) consists of ten weekly dance movement sessions of ninety minutes each. Our interdisciplinary research approach inspired the development and manualization of sessions. During the intervention study, we conducted three interactive groups of seven to nine participants between 3/2012 and 1/2013.

### Approach to the development and instruction of sessions

In contrast to integrative dance and movement therapy approaches, our research aimed to focus mainly on the above-named elements of interpersonal movement coordination, realized as a structured dance and movement program. In the conception, preparation and implementation of sessions, and with respect to an appreciative stance toward participants, we drew on former dance-pedagogic, dance and choreographic and (dance and movement) psychotherapeutic education and experience. The main group instructors, S.M. and A.B., contributed experience in leading dance and psychotherapeutic groups of different ages and of both non-clinical and clinical populations. They were partly supported by a psychologist with experience in instructing movement groups, who mainly implemented the control group.

We believe that in order for autistic participants to get involved in the interactive challenge of imitation and synchronization-based dance and movement sessions and to internalize them as a positive embodied experience, an appreciative stance by the instructors and a trust-building group atmosphere are essential. In our opinion, this is especially relevant for individuals who often have experienced sports or dancing as aversive in the past (as expressed by some autistic participants in interviews conducted in the study context: unpublished material). We therefore aimed both to foster kinaesthetic empathic skills and at the same time to enable a rewarding new experience with joint movement and dance for participants.

## Structure and contents of intervention

### Session structure

| Session part   | Format/setting/music  | Content/aims  |
|--|---|---|
| <b>Short verbal exchange and feedback on take-home assignment</b><br>(approx. 10-15 min) | Sitting circle<br>( <i>without music</i> )  | <ul style="list-style-type: none"> <li>Short verbal exchange on current personal state and the preceding session</li> <li>Demonstration of and feedback on preceding session's take-home assignment</li> </ul>  |
| <b>Warm-up</b><br>(approx. 25min, variable sequence)                                     | Joint movement ritual in a circle<br>( <i>with or without music</i> )   | <ul style="list-style-type: none"> <li>Synchronization of instructor's movements in the group</li> <li>Structured mobilization of different body parts</li> <li>Learning of a set movement sequence of increasing complexity over sessions through imitation</li> </ul>   |
|  | Variations of walking<br>( <i>with music</i> )  | <ul style="list-style-type: none"> <li>Refinement of individual movement expression while connected as a group through music</li> <li>Gradual introduction of creative elements such as variation and contrast</li> <li>Interactional walking tasks as transition to main part</li> </ul>   |
| <b>Main part</b><br>(approx. 35min)  | Interactive tasks based on imitation, synchronization and cooperation in dyads, small groups, and the entire group ( <i>mostly without, occasionally with music</i> ) | <ul style="list-style-type: none"> <li>Imitation and imitation with variation (increasing reciprocity, leading to creation of a movement dialogue)</li> <li>Synchronous movement in the form of simultaneous mirroring tasks (improvised sequences) with variation and contrasting elements of increasing complexity</li> <li>Motoric cooperation in the form of leading and following tasks, creation and reciprocal learning of short moving sequences, creation of a joint choreography</li> </ul> |
|  | Circle dance with set choreography<br>( <i>with music</i> )   | <ul style="list-style-type: none"> <li>Learning of simple circle dances through imitation over four subsequent sessions</li> <li>Dancing as a group in synchrony, joint experience of flow</li> </ul>   |

|  |  |  |
|--|--|--|
| <p><b>Self perception</b><br/>(approx. 5min)</p>                       | <p>Sitting on chairs or standing in a circle, occasional use of props (<i>without music</i>)</p> | <ul style="list-style-type: none"> <li>· Guided self-perception tasks for relaxation and refocusing on oneself</li> <li>· Experience of basic bodily-kinaesthetic self-perception</li> </ul>   |
| <p><b>Feedback and take-home assignment</b><br/>(approx. 10-15min)</p> | <p>Sitting circle (<i>without music</i>)</p>   | <ul style="list-style-type: none"> <li>· Short verbal exchange, including feedback by participants</li> <li>· Explanation of take-home assignment (e.g., observing and imitating movements in others) to facilitate the transfer of awareness of movement and imitation into interactions in every-day life</li> <li>· Handing out documents for written feedback at end of session</li> </ul> |

Of the many different imitation and synchronization tasks designed for the main part of the intervention, one example is the “school-of-fish” task: one person at the front end of the group starts with a simple isolated or whole-body movement. In our variation, the same movement is repeated for a while, so that the group standing behind the first person can take over the same movement in synchrony as exactly as possible. After a while, the leading person moves around 90° to the right, now leaving another person at the front of the group, who has to transform the swing of the last movement into a new repetitive movement, with the group now synchronizing the new movement (for more task examples and an example of a whole session, see Behrends et al., in prep.).

***Meeting needs of autistic individuals***

We sought to consider some as “typical” considered needs of autistic individuals as much as possible in the conceptualization and realization of sessions. For example, the contents of each session followed a reliable structure that was introduced to participants at the beginning of the first session. We also permanently offered a possibility for time-out in sessions according to each individual’s needs. As altered processing of sensoric input is known to be one of the features of ASC (American Psychiatric Association, 2013) and has also been described as relevant in dance movement therapy sessions with adults with autism (J. Edwards, 2015), we avoided sensory overload in our sessions through considerations such as using a room that was sparse in visual or auditory stimuli, avoiding touch in general, and instead using a circular rope to connect in circle dances (Adler, 1970), and refraining from the use of music in new or complex movement tasks. While we implemented a manualized program and kept the amount of the main elements of imitation, synchronization and cooperation constant in sessions, we allowed for slight improvisation for instructors regarding exchange of tasks or variation of settings, in order to attune to the group and keep participants motivated. We worded verbal instructions as precisely as possible, without figurative language, and provided a transparent aim for tasks on a motor or dance level. As part of the development phase of the manual,

typical tasks were tested in several pilot sessions with high-functional autistic as well as non-autistic volunteers and adapted according to their feedback.

### ***Conceptualization of contents over ten sessions***

In the conceptualization of the ten sessions, we paid attention to providing a gradual increase in demands concerning interaction and dance.

| Session | Overarching foci/aims  |
|---------|--|
| 1-2     | Becoming acquainted and building trust with movement in a group in the given space, Building-up of improvisation by showing movement options for different body parts and by take-home assignments such as observing movements in everyday work or sports contexts     |
| 3-5     | Exploring the theme of leading and following through different tasks and settings (partner and group settings, by observation or via contact with a soft ball), e.g. the school-of-fish task: see above  |
| 6-7     | Creation of a short choreography (on the theme of variations of walking), which was then taught through imitation to a partner and performed together in synchrony   |
| 8-9     | Performing a "movement dialogue" as the most advanced form of variation and turn-taking (creating a reciprocal interaction in movement by first imitating and then adding a different element to each other's movements, with elements of both synchrony and contrast) |
| 10      | Repetition and consolidation of favourite movement elements such as circle dances, followed by an opportunity for overall feedback   |

### **Observations, feedback and adaptations**

Study results of objective tests that were analysed quantitatively, including pre- and post-intervention interactional movement analysis, have recently been presented elsewhere (Koehne et al., 2015). Although the following session observations mainly represent personal impressions, we deem them relevant in view of our study aim and suggest further research, including reliable qualitative and quantitative assessments.

### ***Motor and interactional challenges***

Participants experienced and verbally expressed different challenges concerning both dance and movement coordination as such and moving in the presence of or even in direct interaction with a partner or a group.

We observed a *heterogeneous degree of challenge in motor coordination* in participants: While some participants seemed to be rather under-challenged by our initially simple tasks and dances, others showed relevant problems with balance and coordination and needed individual support to avoid losing their balance or even falling. Even when difficulties did not show in our observation, some participants fed back their experience of limitations in motor skills in the

form of realizations such as (in response to the question "Did you experience something new in this session? What was difficult/ what was an important experience in this session...?"): "I have difficulties with balance" (translations of participants' quotes by A.B.), some in walking slowly, some in walking fast or in big steps. We partly adapted tasks to different levels of motor skills, which worked well and provided more challenges in groups with higher overall levels of motor skills.

Another challenge that we encountered in several participants involved *problems with improvisation of movement and partner tasks*. Although we built up the creation of movement gradually, and even if people seemed to us to be at ease and involved, according to our observation, some participants continued to report feeling an internal tension and blockage if they were to suggest a movement to a partner. We reason that this could partly be due to autism-typical preference for structure, but also, on the other hand, to former possible aversive comments and reactions from others that participants might have experienced in earlier contexts such as in school (such as having repeatedly been selected last for sport teams: unpublished material from interviews). One participant expressed in a personal comment a feeling of shame about moving in the presence of others. Having said this, participants only very sporadically and briefly made use of the possibility for time-out, and no participant dropped out after the start of the intervention. While most participants managed partner and group tasks, for some participants, a 1:1 partner setting in observing and imitating movements in particular felt repeatedly unpleasant in the sense of being "too intimate", as one participant reported, independent of physical distance to the partner. Over the course of the sessions, most participants coped well with partner tasks, whereas in one group the aversion of two participants stayed so strong that we changed the partner setting to a small group of three, while keeping the number of interactive elements equal.

In this context, it was important for us to learn that *our personal impressions of participants in sessions were less consistent with their personal feedback comments than in other non-autistic dance and movement groups*. Sometimes we perceived participants as joyful, creative and involved in partner tasks, but at the end of the session received their feedback of having felt very uneasy. We were encouraged by participants to continue making slight adaptations according to their feedback, e.g. integrating participants' music suggestions.

### ***Observed changes in individual involvement and group cohesion over course of sessions***

Regarding the partly significant individual challenges mentioned above, it was remarkable to observe that over the course of the sessions, *almost all participants became considerably involved in expressive movement in individual and interactional settings* (according to one written feedback after the first session: "movement can be easy, too, not only difficult"). We saw *increasing courage and joy in how participants experimented with new movements*, especially in expressive walking to music (e.g., jumping, wild dancing, running with arms spread apart, even sometimes spontaneous contact-seeking behaviour within the group by some

participants). Participants discovered individual resources and joy in movement (written feedback: "I am able to observe and imitate movements well" and "movement can be fun" after the third session). As one special example out of many, in one task of performing and imitating different ways of walking, one participant showed a cartwheel movement to her partner. Moreover, considerable change could be observed between participants as a group over the course. We witnessed *moments of joy, humour and spontaneous interaction* (in the form of smiles, laughter and funny movements directed to each other) *emerging between participants*. Those shared moments began as early as the second session, and became more frequent over the course of the program in different interactional settings such as in partner walking tasks, in presenting choreography and in movement dialogues. Especially in circle dances, which several participants regarded as a session highlight, shared moments of joy frequently emerged in the group, such as while moving in the circle together, when synchronized in a turn, or when accidentally facing each other because of having turned in different directions. Some participants remarked spontaneously on being enthusiastic about the experience of being in synchrony with others, such as in the school-of-fish task, in circle dances or in the moving dialogue. Most participants reported becoming more relaxed in the group over time and enjoying meeting with other autistic people as a fixed weekly appointment. On several occasions, some participants entered a joking and playful mode with each other, and some obvious playful spontaneous group interaction emerged (i.e., a spontaneous soft-ball game between most of the group members before the beginning of session no. 9). Having in mind the difficulties that autistic individuals often experience in interaction with non-autistic interaction partners, we found it remarkable to also witness several spontaneous caring and empathic reactions of participants towards each other (i.e. one participant helped another one who was afraid to show a movement observed in her take-home assignment: he performed his own movement first, then encouraged the other person and expressed his hope that he had not chosen the same movement as her).

## Discussion and Outlook

Our approach to foster empathy through interactional movement and dance is in line with the embodiment approach, which holds that all mental processes are deeply rooted in bodily processes (Glenberg, 2010). As one example of this bodily-mental-emotional interconnectedness, Ann Cooper Albright remarks on the "transformative potential of improvisation" (2003, p. 264) in dance:

Although this [Contact Improvisation] practice begins with an attentiveness to corporeal experience, it also develops a mental flexibility that can provide a sort of intellectual map with which to chart new pathways for negotiating awkward or difficult cultural crossings.

*(Ann Cooper Albright, dancer and scholar, 2003, p. 260)*

### Characteristics of our approach

A strength of the presented dance and movement program lies in the fact that it entails a combination of a functional dance and movement manual and a therapeutic-artistic stance in interactive dance and movement work. Our dance and movement approach thus is more structured than DMT or improvisational dance classes. In its present form, our program does not claim individual psychotherapeutic healing. By having isolated certain elements of joint movement and dance, and mainly working with imitation and synchronization tasks in different variations, our program offers the experience of interactional dance and movement and self-expression in dance and movement on an accessible level, in its first realization tailored to high-functioning autistic individuals. It thus has the potential to motivate individuals who do not seek the therapeutic intensity of DMT in a group setting, but who still want to take action in order to enrich their interactional skills.

### Empathy, sympathy and group cohesion: Study results and personal observations

In our intervention study, we aimed to confirm the hypothesis that by fostering kinaesthetic empathy through a dance and movement intervention based on interpersonal movement imitation and synchronization as key elements, socio-cognitive (i.e., emotion inference and perspective taking) and socio-affective processes (i.e., empathic feelings) can be enhanced in adults on the autistic spectrum without intellectual impairment. Our hypothesis could partly be confirmed by previously published results (Koehne et al., 2015): the interactional movement and dance group showed significantly greater improvement in emotional inference but not in empathic feelings than those treated with the control movement intervention. On the close generalization level, we found increased imitation tendencies (finger movements) and enhanced synchronization abilities (in interaction with a virtual human-like partner) in the interactional group compared to the control group. On the whole-body level, we found increased quantity and quality of spontaneous imitation, synchronization and movement reciprocity (Koehne et al., 2015).

As remarked above, we witnessed several spontaneous caring, sympathetic and empathic reactions of autistic participants towards each other, most prominent towards the end of the course. To our impression, over the course of the interactive dance and movement groups, individuals became more open in verbal comments and movement expression in the presence of others. According to our observations, they also showed more active contact-seeking behaviour and group cohesion than in the control groups. Therefore, considering that in the ASD population, problems in socio-communicative skills and often relevant motor challenges are prevalent, we deem our approach to be potent in fostering social skills and individual resources in autistic individuals.

As one limitation of our study, we did not document our session observations in a standardized way, but in the form of a semi-structured personal report after each session. Another relevant limitation of our study lies in the fact that we did not assess interactive skills, feelings of sym-

pathy, prosocial behaviour or group cohesion as such and thus the described changes remain limited to our personal observations.

According to our observations of individual participants, it might be speculated that emotional empathic processes might also have increased without being detectable in our results. This could be due to the fact that imitation and moving in synchrony with other people influence affective states such as liking, affiliation, and empathic feeling, mainly in the particular situation, i.e. on the state level, directed specifically towards the participating individuals, and that this is less transferable to other situations than, for example, the skill of emotional inference. The fact that only parts of the observed changes could be shown in our assessments (Koehne et al., 2015) relates to reports from another DMT intervention with autistic adults based on mirroring, where individuals were similarly observed to be more outgoing and self-confident after the intervention, but only partly showed subjectively experienced changes as assessed through self-report questionnaires (S. C. Koch et al., 2015). Our short intervention span of ten weeks and the often limited reliability in self-report questionnaires, as well as frequently prevalent challenges in emotional self-awareness and introspection in autistic individuals (Happé, 2003; Johnson, Filliter, & Murphy, 2009), possibly have an additional limiting effect on the verifiability of the observed increase of empathic affective states in individuals and groups.

However, even if the transfer to emotional empathy skills and prosocial behaviour outside the group context so far has to remain speculative, we suggest that the promotion of kinaesthetic empathy through sensitive movement interaction that is embedded in an appreciative and cooperative group setting, with efforts to avoid personal distress, has considerable potential to promote both embodied (kinaesthetic/cognitive/emotional) empathy processes and possibly also feelings of sympathy with disposition to prosocial behaviour within the group. Expanding knowledge on the interrelations of interactional movement and dance with empathy, sympathy, group cohesion and prosocial behaviour is encouraged, especially in the context of psychotherapy and DMT groups. We suggest that further research in the field of dance and movement with ASC groups should include longer intervention spans and the assessment of feelings of sympathy and prosocial behaviour in individuals, as well as more implementation of standardized observational measures or judgements by instructors and close relatives or caretakers in addition to self-report measurements.

### **What are the effective factors in our intervention?**

We isolated for our research the interactional movement elements of imitation, synchronization and embodied cooperation, and built our interactive dance and movement intervention upon them as key elements. As a basis for empathy and reciprocal interactional skills, we also included elements to foster self-perception and self-expression in movement as well as self-other distinction. With the main choice of imitation and synchronization elements, we are in line with dance and movement therapist Claire Schmais, who isolated "synchrony" as one out of eight healing processes in group dance therapy and encouraged further research in the form

of “systematic investigation” on single factors (Schmais, 1985). But although we tried to investigate isolated key elements in our study, at least three potential mechanisms may have contributed to the observed effects, namely imitation, top-down modulation of imitation (imitation inhibition), and interpersonal movement synchronization, with the combined application not allowing us to identify single or combined causalities. Furthermore, those mainly postulated mechanisms cannot be separated from many more possibly effective factors such as group energy and dynamics, the personality and background of instructors, verbal rounds, self-perception, music, etc. Schmais (1985, p. 18) remarked on this dilemma, which remains relevant in psychotherapy research, that “none of the above [eight healing] processes can be fully understood in isolation since they are functionally dependent on each other”. We agree, stating that in work with dance and movement groups in a way that supports positive change, there will always be different factors at work at the same time.

### **Suggested prerequisites for therapists**

For a therapeutic implementation and evaluation of our approach, we deem education and experience of instructors in psychotherapy and dance and movement therapy in group settings essential, and even more so for clinical populations. From our experience, we strongly recommend working as a co-team, which we found valuable in the preparation, implementation and evaluation of each session.

### **Suggestions considering work with ASC groups**

In our experience, a synthesis of structured preparation and flexible adaptation of session contents according to individual and group dynamics proved suitable for ASC groups and managed to keep participants adherent despite high interactive challenges. As a general experience from dance and movement work with autistic individuals, we encourage the use of a combination of oral *and* written feedback, since it proved helpful for us in order to adapt contents to participants’ needs (oral feedback in the closing rounds and written feedback on prepared sheets at the end of sessions, with both multiple-choice and open questions). This is due to the discrepancy we experienced between our personal resonance to participants in movement and their verbal comments afterwards, as also discussed by Koch et al. (2015), and can help in further adapting session contents to participants’ needs.

Session observations and impressions from feedback rounds in control (non-interactive) movement groups as well as interviews with some participants (unpublished material) also hinted at an increase in subjective well-being and also a tendency to more group cohesion at the end of the intervention, although to a much smaller extent than in the interactive groups. Several participants from both the intervention and the control group expressed that they had experienced the weekly sessions with other individuals on the autism spectrum as valuable. We therefore propose that in addition to interactive dance and movement groups, sports groups in general suiting the needs of autistic individuals would be desirable.

### Outlook on possible therapeutic applications

The present intervention study was advertised to foster health and general wellbeing through movement and was conducted outside therapeutic institutions with autistic volunteers without severe psychiatric comorbidities (some common comorbidities such as mild depression were allowed: cf. Köhne et al. 2015, for details on exclusion/inclusion criteria). Since participants did not seek psychotherapeutic treatment or social skills training, our study was not a therapy study. So far, we thus cannot provide implementation experience or knowledge on outcomes in therapeutic settings. Nevertheless, in the theoretical conception of the intervention, a therapeutic application has always been intended as an outlook, and session observations show therapeutic potential.

We suggest that the dance and movement approach presented here can help in promoting empathic functions in different populations with problems in empathic attunement and self-other distinction, and suggest different adaptations and evaluation in the form of therapy studies. From its original conceptualization, an implementation of the presented approach in the treatment concept of Borderline Personality Disorder (BPD), social conduct disorder, and for individuals with narcissistic and antisocial personality traits appears to be promising. For example, in individuals diagnosed with BPD due to harmful developmental-psychological conditions, disturbances concerning the self-perception on a corporeal/kinaesthetic level as well as concerning self-other distinction on affective and cognitive levels have been described (Bateman & Fonagy, 2006; Rudolf, 2013). Our approach could therefore complement self-other differentiating and (cognitive) empathy-fostering approaches such as mentalization-based treatment for individuals with BPD (Bateman & Fonagy, 2006) on an embodied level (see also Waidelich, 2009). Depending on the education and experience of therapists, adaptations for children and adolescents in preventive or treatment contexts are possible. As a general rule, considering further evaluation of our approach, psychotherapeutic and dance and movement therapeutic experience with the given clientele must be provided in order to meet the specific needs of the different conditions and to keep the group integrated. Since our approach also fosters self-expression and self-other distinction as well as an experience of agency in movement interactions, it is suggested that after adaptation of the intervention, psychotherapeutic-psychiatric populations with deficits concerning sense of self and mentalization, such as in chronic depression (Taubner et al., 2015; Taubner, Kessler, Buchheim, Kächele, & Staun, 2011), and possibly also social anxiety disorders, could also benefit from the program. Pinniger et al. (2012) have demonstrated the Tango Argentino to be effective in increasing mindfulness and reducing depression and stress levels in depressive individuals. In counselling contexts, similar approaches to the one we have presented are already being applied. For example, a Korean group (Kim, Kang, Chung, & Park, 2013) applied a kinaesthetic empathy program with three married couples in conflict and reported in their very small sample experiences of self-awareness and emotional attunement in participants.

In different populations and individuals, the focus of dance and movement tasks and elements should be placed according to individual and group needs: we suggest more expressive and self-perceptive tasks and contrast in interaction to promote agency, and more imitation/synchronization and cooperation to promote empathy, sympathy and group cohesion. Further research on adapted forms of the program in the form of treatment outcome studies with specific populations is necessary before integration in therapeutic contexts.

Since our research project started with personal inspirations from dance, DMT pioneer Trudi Schoop might provide a closing remark with her statement from 1978 (2000, p. 101) [on the future development of DMT] that “whatever we will find out – and I believe that we will find out plenty – will come from the *power of dance itself*.” In view of the manifold social challenges in our world for individuals and societies, may the power of dance be a continuous peaceful inspiration and support people in experiencing and enjoying community both with others and with themselves.

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