



Moving in and out of synchrony: A concept for a new intervention fostering empathy through interactional movement and dance

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ABSTRACT

In this theoretical article, we link literature from different disciplines such as the neurosciences and psychology, dance/movement therapy, dance studies, and philosophy, in order to show that interactional, coordinated movement forms an important base for the development of empathy and prosocial behavior. The presented body of literature suggests that specific elements of joint movement and dance, namely imitation, synchronous movement and motoric cooperation, are suitable for fostering empathic abilities, especially in people with empathy deficits.

In the second part of the article, we present a newly conceptualized dance and movement intervention for people with empathy dysfunction, tailored to its first application for people with autism spectrum disorders. Through enhancing and refining kinesthetic empathy skills, we hypothesize within an integrative concept of empathy, that both emotional and cognitive empathic processes such as empathic concern and perspective taking can be fostered. With a first treatment outcome study of the presented intervention that we will conduct in the near future with people on the autistic spectrum, we aim at evaluating the program and contributing to the understanding of dance and movement approaches for people with empathy deficits.

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Introduction

Dance, movement and embodiment

Joint dance and movement are known for their potential to promote social bonding in many cultures. Moreover, in making use of the interrelation of body, mind and spirit, dance also plays an important role in the healing rituals in many cultures (Chaiklin, 2009). Over the past decade, the body has gained increasing recognition in academic research as the crucial platform for perception and expression of emotions and intersubjectivity. Research in the field of embodiment has been expanding in different disciplines such as philosophy, arts, linguistics, neurosciences and psychotherapy. Across those disciplines, it is widely accepted that the dualistic body–mind distinction outlined by Descartes ought to be overcome (e.g., Damasio, 1994). According to enactive or embodied cognitive science approaches (e.g., Fuchs, 2009; Thompson, 2001; Thompson & Varela, 2001), "the mind is not in the brain; it is not located in any one place at all, but is rather distributed among the brain, the body and the environment" (Fuchs, 2009, p. 221). Some authors with a

broad conceptualization of intersubjectivity and empathy even call for a simultaneous analysis of the relation between subjectivity and the world (Zahavi, 2001).

Dance/movement therapy (DMT)

Dance/movement (psycho-)therapy (DMT) is an internationally widespread body- and art-based form of psychotherapy for many somatic and psychic illnesses that has been developed since the 1940s with different orientations (Willke, 2007). The therapeutic use of dance in DMT is based on the essential realization that individuals can, through the medium of dance, relate to the community they are part of, and can simultaneously express their own impulses and needs within that group (Chaiklin, 2009). The body in movement is the main focus of therapy as the central medium for emotion perception and expression and an important source of personal resources and vitality (Quinten, 2008). Therapeutic interventions in DMT support kinesthetic and emotional perception as well as expressive and social-communicative skills. DMT is especially effective in strengthening a sense of security in people with alienated or distorted body experiences. DMT is effective in strengthening a sense of security (Waidelich, 2009). It is aimed at the development of a realistic and accepting approach to a person's own body as well as at new and positive movement experiences (Willke, 2007). Interactive therapeutic elements

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with creative, cooperative, imitative or synchronous aspects aim at increasing the quality of and possibilities for relationships with other people and are frequent interventions in DMT group treatment (e.g., rhythmic dancing in a circle as described in different writings by M. Chace, in Sandel et al., 1993). Dance/movement therapy is currently being applied as a part of clinical and outpatient therapeutic schedules for treatment of a wide range of psychiatric diagnoses such as neurotic, psychosomatic, and trauma-related problems (Chaiklin & Wengrower, 2009; Payne, 2006; Quinten, 2008; Trautmann-Voigt & Voigt, 2007). However, to date, relatively few treatment outcome studies have been published (e.g., Bräuninger, 2006; Jeong et al., 2005; Koch, Morlinghaus, & Fuchs, 2007; Ritter & Low, 1996) and there exist few diagnosis-specific conceptualizations (e.g., Koch & Weidinger-von der Recke, 2009; Moore & Stammermann, 2009; Weber, 1999).

Challenges in DMT research

Many dance/movement therapists and dance teachers have expressed the idea that joint movement and dance strengthen bonds between people and make people more perceptive to other people's emotional states. The empathy-enhancing potential of the mirroring of the client by the therapist as a therapeutic intervention in DMT has been recently discussed in this journal (McGarry & Russo, 2011), emphasizing the importance and actuality of empathy and DMT as a research area. To our knowledge, however, no conceptualization exists to date of the empathy-fostering potential of more general interpersonal coordination processes between participants in dance and DMT. Furthermore, no prospective research on empathy-fostering qualities of dance and movement methods or specific group interventions has been published. One of the reasons might be that dance and movement in social contexts – and maybe even more therapeutic work in DMT – are difficult to investigate because they are characterized by complex creative and intuitive rather than controlled or standardized processes. Despite the fact that a broad range of methods and techniques that are applied in DMT are well documented (e.g., Willke, 2007), empirical research on how specific DMT elements work is just beginning (e.g., circle dances; Koch et al., 2007).

Researchers in the fields of body psychotherapy and DMT have expressed the need for specific research with a focus on the investigation of the effects of key elements of a certain therapy form and the integration of qualitative and quantitative paradigms (Berrol, 2000; Loew & Tritt, 2006). Following trends and standards in psychotherapy research, it has been strongly recommended that a body-psychotherapeutic intervention be comprehensible and manualized with a theory-driven therapeutical conception (Loew & Tritt, 2006). For those reasons, we decided to focus our research on developing and evaluating an empathy-fostering intervention consisting of specific elements of dance and movement while still enabling a comprehensive movement experience.

Our research team is constituted as a multidisciplinary group. This allows us to reflect a broad variety of approaches, methodological input, and experience, integrating psychology, dance/choreography, and dance education, child and adolescent psychiatry/psychotherapy, and dance/movement therapy, with additional comments from dance studies and music therapy.

Outline of this article

In this article, we provide a conceptualization for a 10-week empathy-fostering intervention, entailing interactive movement and dance elements. A first treatment outcome study will be conducted in the near future with people on the autism spectrum in a nonclinical setting. As a basis for our reasoning to link movement and dance with empathic and interactive abilities, we first

summarize dimensions of empathy, its bodily/kinesthetic aspects, and developmental–psychological prerequisites, then provide a review of the literature on perception–action coupling and selected movement elements. The research hypothesis for our dance and movement intervention study that will start in the near future is as follows: By fostering kinesthetic empathy through a set of interpersonal coordination tasks as key elements, emotional and cognitive empathic capabilities, interactive skills, and prosocial behavior can be enhanced in people with empathy deficits.

Dimensions of empathy

Multidimensionality of empathy

Empathy as an (nonconscious or conscious) intent to share another person's inner state is a fundamental human prerequisite for cooperation and prosocial behavior. The construct of empathy has been researched and discussed from various disciplines such as, psychology, philosophy, psychiatry, and dance studies. Across disciplines and publications, definitions and conceptualizations of empathy vary widely (e.g., Blair & Blair, 2009; de Vignemont & Singer, 2006; Foster, 2011; Lamm, Batson, & Decety, 2007; Singer & Lamm, 2009; Zahavi, 2001). Some authors emphasize the emotional or affective response in empathy, whereas others focus more on its cognitive aspects. Affective or emotional aspects of empathy refer to the observer's response to another person's emotional state in the sense of feeling similar emotions in oneself as in the person observed or of feeling prosocial emotions toward that person. The cognitive side of empathy comprises mentalizing processes such as, for example, the labeling of emotions, perspective-taking, and inferring mental states. Emotional and cognitive aspects of empathy are interdependent but different processes. This is underscored by the fact that emotional and cognitive empathic capacities can be developed to different degrees, as shown in individuals with Asperger's syndrome (Dziobek et al., 2008). In this article, we refer to a multidimensional and embodied definition of empathy, integrating its cognitive, emotional, and corporal/kinesthetic dimensions.

The bodily and kinesthetic dimension of empathy

The term kinesthesia, although having undergone several revisions since its coining in 1880 (Foster, 2011), can broadly be defined as the sensation of movement and body posture, integrating proprioceptive and other sensory information from inside and outside the perceiving organism (Reynolds, 2007). In line with Foster (2011), a researcher in dance studies/dance history, we argue that in the context of a social interaction, kinesthesia is an important aspect of empathy because it refers to a person's own corporal feeling as a response to the body movements or posture of someone else. Thus, the kinesthetic dimension of empathy allows us to feel the physical state of another person with our own body. Foster (2011) advocates an integrative concept of empathy by saying, "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" (p. 10).

Dance and dance studies provide relevant concepts that can be fruitful for empathy research in other disciplines. Inspired by the psychophysiological research of the early 20th century, dance practitioners and researchers like Rudolf von Laban (1966) and John Martin (1936) conceptualized a close connection between motion and emotion in dance and the perception of dance. Recently, the concept of kinesthetic empathy has gained increasing relevance in international conferences and publications in dance and dance studies (Conferences: "Kinesthetic empathy," Manchester, 2010,

and “Touching and to be touched – kinesthesia and empathy in dance,” Berlin 2011. Publications: Foster, 2011; Reason & Reynolds, 2010). In dance/movement therapy, the concept and processes of kinesthetic empathy (the therapist empathizes and comes into contact with the patient by partly experiencing, sometimes also partly adopting, his or her presented posture or movement qualities) have been playing an important role in therapeutic practice and literature from its inception until today, and are considered to be one of the major contributions of DMT to psychotherapy (Fischman, 2009; Levy, 1992; Sandel, 1993; Schoop, 1974).

The first conceptualizations of empathy (with the term “Einfühlung” by Vischer in 1873, later translated into English by Titchener in 1909) entailed a strong component of kinesthetic sensation, with both Vischer and Titchener seeing empathy as an experience undertaken by one’s entire subjectivity (as reviewed by Foster, 2011). Lipps, who further developed the concept of “Einfühlung” in his work in aesthetics, characterized this aspect of intersubjectivity as a kinesthetically-based process, namely, as a kind of inner imitation of the perceived movements of others (Lipps, 1923, second section). Underlining the importance of the two-sided body in intersubjectivity in a phenomenologic approach, Husserl emphasizes the crucial role of interior bodily self-perception with its possibility of simultaneously exploring one’s own exteriority as an essential precondition for recognizing others and empathy (Husserl, 1973, also see Zahavi, 2001). In the tradition of phenomenological concepts (Stein, Husserl, Merleau-Ponty), various philosophical approaches of embodied intersubjectivity have been conceptualized and described (e.g., Fuchs, 2009; Fuchs & De Jaegher, 2009; Zahavi, 2001).

From another point of view, neuroscientist Gallese (2003) also stated that “empathy is deeply grounded in the experience of our lived body” (p. 176). On the other hand, in most neuroscientific conceptualizations, the embodied and kinesthetic dimension of empathy still remains underestimated in our understanding (e.g., de Vignemont & Singer, 2006). Empathy researchers Blair and Blair (2009) explicitly exclude empathy’s kinesthetic dimension in their empathy concept because no data have been available thus far to relate motor empathy to moral or social rule development.

Developmental–psychological prerequisites of empathy

The development of emotional and cognitive empathic abilities depends on some important developmental–psychological prerequisites that can only briefly be outlined here.

Self-perception and sense of self

From infancy research, it is known that the development of different aspects of the sense of self is a crucial basic requirement for the ability to engage in reciprocal interpersonal relationships, as well as for self-perceptive processes such as awareness of corporal states and emotions (Stern, 1985/2000). According to Stern (1985/2000), the sense of self is a kind of preverbal organizing subjective experience that is first shaped in the infant’s early interactions with the caregiver, the first medium of perception and communication in the young infant being the tactile/motoric mode. In the field of music therapy, Stern’s concept has been diagnostically elaborated upon in order to assess the development of the sense of self and the quality of the relationship to the therapist in patients (Schumacher & Calvet, 2007; Schumacher, Calvet, & Reimer, 2011). In a longitudinal study, it was shown 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 (Feldman, 2007a). In the presented intervention, we suggest to foster self-perceptive abilities on the corporal/kinesthetic level, a dimension that often has been found to be disturbed in patients with

problems in interpersonal relationships (e.g., in borderline personality disorder; Rudolf, 2006).

Self-other differentiation

The ability to distinguish between the self and other, which is also developed from the earliest interactions with the caregiver and depends on the quality of the attachment relationship (Fonagy, Gergely, Jurist, & Target, 2002), is another crucial aspect of empathy and social relationships: In order for empathy to appear in the form of empathic concern and to result in sympathy and prosocial behavior, an awareness is required that it is the other person who is in distress or in need. Otherwise, projecting oneself too much into an aversive situation can lead to empathic overarousal or personal distress in the empathizer without prosocial action (Decety & Lamm, 2006).

(Nonverbal) expressive skills

In order to share feelings in social relationships, both recognizing the body of another person as an expressive unity and the quality of one’s own nonverbal expression (coordination of one’s own bodily responses such as emotion-congruent gesture and posture) play an important role throughout life (e.g., Krueger, 2010). Rhythmic interactive processes and mutual imitation between caregiver and child constitute a central role in the development, not only of an implicit sense of self but also of primary intersubjectivity including expressive abilities (e.g., Nadel-Brulfert & Baudonniere, 1982; Trevarthen & Aitken, 2001). We reason that a person’s own movement repertoire builds an important foundation for empathy because it forms the basis for self-expression as well as for perceiving and interpreting another person’s nonverbal behavior.

Bodily dimensions of social interactions

Within our integrative empathy approach, empathic interactions comprise both the perception of the cognitive–emotional–bodily state expressed by the interaction partner and the perception and expression of one’s own cognitive–emotional–bodily state (see Fig. 1).

The availability of an efficient body schema has been suggested as being necessary not only for recognizing one’s own actions, but also for understanding the actions of others (Decety & Sommerville, 2003). In this context, we reason that empathic and intersubjective abilities are fostered by well-developed perceptive and expressive abilities in all of the interconnected levels of body/kinesthesia, emotion, and cognition. In order for reciprocity in the interaction to happen, one has to be able to focus alternately on oneself and the other person in the interaction. Bodily interaction consists of –among other elements – imitative (mimicry), complementary,

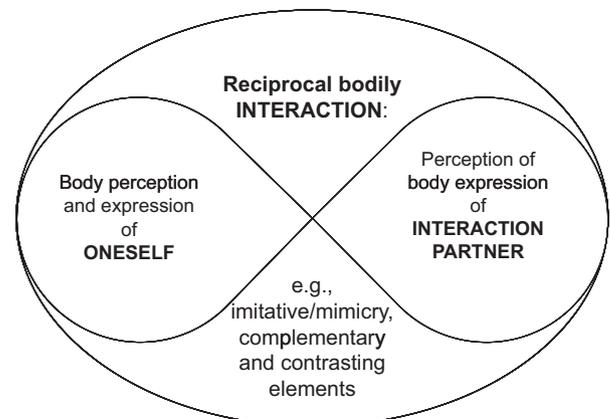


Fig. 1. Bodily dimensions of social interactions.

and contrasting elements in posture and gesture. All of the mentioned perception and expression processes cover both automatic and conscious aspects.

In the proposed dance/movement intervention designed to foster empathy, we propose a strengthening of the outlined prerequisites of perceptive and expressive abilities by integrating corresponding tasks; nevertheless, the main focus of this article and of the intervention is the interaction process in movement. We suggest that kinesthetic interpersonal experiences, especially in alternation between moving in synchrony with others and moving for oneself while being aware of other people (moving in and out of synchrony), can be important for strengthening a sense of connectedness with others as well as for refining the self-other differentiation, which are both needed in empathic social interactions.

Empathy disorders

Examples of psychiatric disorders with relevant problems in empathic processes are, among others, autism spectrum disorders (Dziobek et al., 2008), narcissistic personality disorder (Ritter et al., 2010), borderline personality disorder (Preissler, Dziobek, Ritter, Heekeren, & Roepke, 2010), and social conduct/antisocial personality disorders (Blair & Blair, 2009; Taubner, Wiswede, Nolte, & Roth, 2010). Different empathy disorders have varying parts of pathogenetic roots (e.g., genetic causes and/or damaging attachment relationships) and can comprise to varying degrees problems in different dimensions of empathy: emotional disorders, mentalizing problems, and difficulties in the bodily dimension (body perception, body image, and/or body perceptive/coordinative functions).

In our research, we have begun to work with movement and dance elements with people from the autistic spectrum, an approach also suggested in McGarry and Russo's (2011) remarks on mirroring processes. Characteristic problems of people on the autism spectrum include difficulties in the field of social interaction and reciprocal communication and a restricted, stereotyped, and repetitive repertoire of interests and behaviors (DSM-IV, American Psychiatric Association, 2000). Other characteristics in autism are altered sensory perception and processing of acoustic, visual, and other sensory input. Besides difficulties in theory of mind (i.e., cognitive empathy in children and adults with autism spectrum disorders) (Baron-Cohen, Leslie, & Frith, 1985; Baron-Cohen & Wheelwright, 2004), past research has also shown problems with imitation processes (Williams, Whiten, & Singh, 2004) and motor behavior such as fine and gross motor skills and balance in autistic children and adolescents (Freitag, Kleser, Schneider, & von Gontard, 2007; Green et al., 2002; Noterdaeme, Mildenerger, Minow, & Amorosa, 2002). Based on our integrated conceptualization of empathy, we therefore suggest giving autistic people the opportunity to develop and strengthen the kinesthetic component of empathy.

Neurobiology of kinesthetic empathy

Perception–action coupling and the mirror neuron system

The term perception–action coupling refers to the fact that action perception and action production are functionally intertwined and share common neural structures, with a bidirectional association between a motor pattern and the sensory effects that it produces. Perceiving the action of another person automatically relates to the observer's mirror neuron system, with the effect that in the observer, the same brain areas are being activated as though one is performing the action oneself. In other words, an interindividual mapping of observed movements between the acting person and the observer is created (Decety & Meyer, 2008;

Semin & Caccioppo, 2008). In the context of emotion processing, the same mechanism has earlier been suggested to explain empathic processes in the sharing of emotional states through observation or imagination with corresponding somatic and autonomic responses in the observer (Preston & de Waal, 2002). Perception–behavior linkages have been repeatedly suggested to play an important role in creating affiliation, rapport, and social cohesion (e.g., Chartrand & Bargh, 1999; Lakin & Chartrand, 2003).

The neural correlate for perception–action coupling has been named the mirror neuron system, which has important functions in various imitation and empathic processes (for a review, see Rizzolatti & Craighero, 2004). Mirror neurons are localized mainly in the ventral premotor and parietal cortex, with different associated brain regions becoming active depending on the type of empathic or imitative processes involved (Iacoboni, 2005; Lamm, Decety, & Singer, 2011; Singer & Lamm, 2009; Singer et al., 2004).

Mirror neuron research has led to concepts of embodied simulation and intercorporeity as central functional mechanisms for empathy (Gallese, 2009). Those concepts point toward a strong neuronal connection between one's own motor experience and intersubjective and empathic processes. The mechanism of embodied simulation implies that during observation of the bodily–emotional state of someone else, the same mirror neuron structures are activated in the observer as in the person observed, whereby an internal simulation of the state observed in the other person is generated with this sharing of body states enabling implicit understanding (Gallese, 2008, 2009). According to Gallese (2009), basic aspects of social cognition are primarily based on motor cognition. He concludes from De Prester following Merleau-Ponty, that “our own acting body becomes the main source of information about other's behavior” and suggests that embodied simulation has a crucial function for empathy (Gallese, 2009, p. 494). Gallese even proposes that “intersubjectivity is the best conceived of as intercorporeity” (p. 486).

The role of prior movement and dance experience in action observation

The internal/embodied simulation of an observed action evokes the activation of complete action patterns in the mirror neuron system. This process is influenced by a person's previous motor experiences and individual, acquired motor (above visual) representations: The results from two fMRI studies with expert dancers (Calvo-Merino, Glaser, Grèzes, Passingham, & Haggard, 2005; Calvo-Merino, Grèzes, Glaser, Passingham, & Haggard, 2006) revealed more activation in mirror neuron circuits while dancers watched their own dance style, or respectively watched movements from their own motor repertoire, compared to watching another dance that they were not experienced in, or respectively watching moves from the opposite gender that they frequently observed but did not perform themselves. In a similar longitudinal fMRI study, Cross, Hamilton, and Grafton (2006) showed an increased mirror neuron response in expert dancers while they observed novel dance sequences they had previously acquired during a 5-week training. Catmur, Walsh, and Heyes (2009) argued for a causal relation between combined sensory/motor experience and modeling of the mirror neuron system: By reviewing the literature on sensorimotor experience, imitation experiments, and fMRIs of mirror neuron areas, and by their own transcranial magnetic stimulation experiments, they strongly support the critical role of sensorimotor experience and previous training in the development of automatic interpersonal imitation processes. It is also important that the probability of repeating a formerly internalized and then observed action is higher than while observing a new action (i.e., it increases with the similarity of motor representations): observing another person's movements activates one's own neuronal action

system for the same movement (Knoblich & Sebanz, 2006) and increases the probability of initiating a matched action from one's own motor repertoire (Brass, Bekkering, & Prinz, 2001).

These studies show that the neuronal system of internal motor representations can be modified by movement experience and that sensorimotor expertise in a certain movement increases the probability of implementing that movement in a social interaction. In the context of our research, these studies support the approach of fostering empathy and prosocial interactions through the experience and practice of coordinated interactional movement and dance.

Interactional movement and prosocial behavior

Much research shows that humans are responsive to movements of an interacting partner. Core elements of embodied social cognition that promote bonding and cooperation have been described as synchronization, coordination, and co-regulation of behaviors (Semin & Caccioppo, 2008). Interpersonal coordination as the umbrella term has been defined as the “degree to which the behaviors in an interaction are nonrandom, patterned, or synchronized in both timing and form,” and consists of two basic types: behavior matching or similarity and interactional synchrony (Bernieri & Rosenthal, 1991, p. 403). With respect to specific interactional movement elements, we will now review research on the prosocial and/or empathy-promoting effects of: (1) imitation, (2) synchronous movement, and (3) motoric cooperation conducted in the field of experimental psychology and in contexts of psychotherapy and creative art therapies.

Imitation

The phenomenon of mimicry or imitation is referred to as behavioral matching and happens, more often than not, unintentionally (Lakin, Jefferis, Michelle Cheng, & Chartrand, 2003). Mimicry, as a genuine human tendency in an interaction to unconsciously imitate a partner's gestures, posture, and speech, serves important functions in communication, social bonding, and affiliation as a type of “social glue” (Lakin et al., 2003). It has been shown empirically that mimicry in an interview situation leads to stronger affiliation and rapport, the likeliness of mimicking increasing with the degree of the (conscious or unconscious) desire to affiliate (Lakin & Chartrand, 2003). Lakin et al. (2003) suggest that mimicking the behaviors of other people could increase prosocial behaviors in a more general way, an argumentation shared by van Baaren, Holland, Kawakami, and van Knippenberg (2004), who showed that study participants who had been mimicked behaved more helpfully and generously toward other people than unmimicked participants.

The growing body of research of unconscious imitation together with the strong hints for its evolutionary social bonding power suggest that good mimickers have a genuine social advantage because their mimicking leads to liking and inclusion by their corresponding social group (e.g., Lakin et al., 2003). It seems therefore obvious that people with empathy deficits, especially those with poor kinesthetic empathic capabilities who also are less skilled mimickers, are at a higher risk of being socially excluded.

Synchronous movement

Interactional synchrony is mainly defined as interpersonal coordination of behaviors in the dimension of time, with similar or even different, but simultaneous movements or change of postures (e.g., Hove & Risen, 2009; Lakens, 2010). Synchronization in a child's earliest social interactions plays a pivotal role for the development of

affect regulation and later, empathy (for a review on synchronization processes in parent–infant interaction, see Feldman, 2007b).

In empirical psychological research, there is growing evidence for the effects of synchronous movement on affiliation and cooperation. Basic synchronized activity such as synchronized walking results in more cooperation and personal sacrifice in group economic exercises (Wiltermuth & Heath, 2009). Hove and Risen (2009) conducted a series of tapping experiments: tapping in synchrony with a metronome showed no effect on affiliation toward the non-tapping experimenter, whereas affiliation toward the experimenter increased in the student probands after they had tapped in synchrony with the experimenter. The authors therefore suggest a causal influence of interpersonal synchrony on affiliation. Valdesolo, Ouyang, and De Steno (2010) performed a study involving synchronous whole-body movement when asking participants to rock in synchrony on rocking chairs, followed by a joint-action task. They found that this kind of synchrony enhanced individuals' perceptual sensitivity to other people's movements and also increased success in the joint-action task, suggesting that the experience of whole-body synchrony promotes cooperative ability.

Music and dance

Joint rhythm experience in music and dance seems to be an innate human tendency. Eerola, Luck, and Toivianen (2006) showed that children as young as 2–4 years of age rhythmically entrain (assimilate in rhythm) in the form of whole-body dancing movements to music pieces of different rhythms, whereby the ability to synchronize increases with age. Within a social context, the tendency to synchronize has been shown to be higher compared to a non-social situation: In the presence of a drumming person, even young children from 2.5 years of age were able to adjust their drumming tempo to a beat outside the range of their spontaneous motor tempo (Kirschner & Tomasello, 2009). The authors suggest that joint drumming evokes a specific human motivation to synchronize movements during joint rhythmic activity, a phenomenon well-known in most people's experience in contexts of music and dance. Wiltermuth and Heath (2009) showed that synchrony in collective singing with and without simultaneous moving fosters cooperation and social contributions, a result that might provide one possible explanation for the attraction of engaging in choirs. After drumming with a synchronous drumming partner, people showed more spontaneous prosocial helping behavior toward that person (measured as the number of pencils picked up after the drumming partner dropped them, seemingly by accident) than toward an asynchronous drumming partner (Kokal, Engel, Kirschner, & Keysers, 2011).

Psychotherapy, music therapy, and dance/movement therapy

In their research on dyadic psychotherapies, Ramseyer and Tschacher (2010) quantified the frequency of nonverbal synchrony between therapist and patient by the video analytic method of motion energy analysis. They found that a high quantity of nonverbal synchrony was positively associated with therapeutic relationship quality and long-term therapy outcome, as rated by patients during and after the end of therapy (Ramseyer, 2010; Ramseyer & Tschacher, 2010). In music therapy, synchronous moments (intra- and intersynchronization; Schumacher & Calvet, 2008) have been intensively studied and described with respect to their importance in enhancing interactive abilities, especially in the treatment of autistic children and patients with mental retardation (Bergmann, Sappok, Schumacher, & Diefenbacher, 2009; Schumacher, 2004). Naturally, synchronization of whole-body movements to music or to other people (as a conscious as well as unconscious process) constitutes an effective central element in dance/movement therapy. Marian Chace (1951/1993), Chace

(1952/1993) has written that moving in rhythmic action in unison results in a feeling of well-being, relaxation, and good fellowship for psychiatric patients, and that joining the dance circle strengthens relationships and helps in the process of resocialization. Early clinical observations by therapists in the field of DMT had placed a high emphasis on synchronous movement and led to the assumption that movement synchrony both facilitates and signifies movement empathy (Fraenkel, 1983). Drawing from her own research on non-verbal behavior in talking dyads, Fraenkel (1983) suggests that echoing processes may be the kinesthetic analogue of reflective techniques applied in verbal psychotherapy.

Therapeutic mirroring remains an important although controversial technique in dance/movement therapeutic practice. The empathy-fostering potential of the mirroring of the patient by the dance/movement therapist has been discussed and illustrated through examples by Berrol (2006), and has recently been underscored in a review article by McGarry and Russo (2011), especially as exaggerated or extended mirroring. Nevertheless, attention should be paid to the fact that hyperimitation may lead to aversive reactions in mimicked partners (for psychiatric patients, see Chace, 1953/1993). In a review and discussion chapter by Willke (2007), the significance and dangers of mirroring in DMT are critically elaborated. For reasons discussed there, many dance/movement therapists apply mirroring sparsely, embedded in the therapeutic process and, as in Chace's understanding, as only one of many possibilities of empathic reflection (see Sandel, 1993). Nonetheless, we argue in line with McGarry and Russo that mirroring processes support empathic capabilities and extend their idea of a therapy consisting of therapeutic mirroring to our concept of practicing different interpersonal coordination tasks in a group setting. We hope that our review of the prosocial effects of synchronous movement in natural, experimental, and therapeutic contexts has made evident the integration of synchronous elements (including mirroring) in the presented group intervention.

Motoric cooperation

Marsh, Richardson, & Schmidt (2009) apply the term *embodied cooperation* to the coordination of goal-directed actions of two copresent individuals in motion. According to Sebanz, Bekkering, and Knoblich (2006), joint action implies "bodies and minds moving together" and can be defined as "any form of social interaction whereby two or more individuals coordinate their actions in space and time to bring about a change in the environment" (p. 70). In everyday life, social interactions often require motoric cooperation in order to achieve a common goal or as part of empathic responses (e.g., helping another person to move or carry an object).

The success of coordinating such a joint goal-directed action depends on different abilities: to share representations, to predict actions, and to integrate predicted effects of one's own and others' actions (Knoblich & Sebanz, 2006; Sebanz et al., 2006). Valdesolo et al. (2010) describe the abilities required for the joint-action task after their synchrony experiments (moving a wooden labyrinth together in order to direct a ball along a certain path) as a dynamic detection and appropriate response to the movement of one's partner. In reviewing studies on joint action, Knoblich and Sebanz (2006) underline that basic action–perception links are crucial for many social interactions. We integrate motoric cooperation tasks in our intervention, in order to enable participants to practice the adaptation of their motoric performances in relation to an interaction partner while pursuing a common goal, as needed in joint social action in everyday life. As an example from psychotherapy, Twemlow, Sacco, and Fonagy (2008) describe that the combined application of a body-oriented approach requiring interpersonal coordination (there: traditional martial arts) and psychodynamic psychotherapy proved effective in clinical vignettes in the

treatment of young people who engage in violent behavior, a condition frequently associated with empathy deficits.

Research hypotheses

On the basis of the role of body and movement in empathic processes, our main research hypothesis is as follows: The practice of interactional movement and dance elements, especially imitation, synchronous movement and motoric cooperation, can foster empathic and prosocial capabilities. In line with Catmur et al. (2009), we argue additionally that it is possible to promote automatic interpersonal coordination processes by corresponding sensorimotor training. We suggest that the conscious practice of variations of imitation and mirroring (with both copying and contrasting of movements) has the potential to foster both unconscious mimicking behavior and the important ability of self-other differentiation, and to thus contribute to increased social integration, affiliation, and agency. The practice of self-perceptive tasks together with tasks that increase expressive and creative possibilities (movement repertoire) additionally fosters the prerequisites needed for coordinated and empathic interactions.

Taken together, by increasing and differentiating internal motor representations of coordinated and cooperative actions, we suggest that the perceptive, expressive, and interactive repertoire as a basis for empathic processes can be enhanced. We are aware that the postulated transfer of kinesthetic empathy to other dimensions of empathy and prosocial behavior requires further investigation, all the more because there are important voices in empathy research that separate bodily/kinesthetic aspects and cognitive–emotional dimensions of empathy (Blair & Blair, 2009; de Vignemont & Singer, 2006). We still suggest on the extensive basis of the presented research on perception–action linkage that the proposed transfer is very likely: on the basis of the intertwining of the perception of another person's nonverbal expression and one's own movement/gesture experience and repertoire, we conclude that experiencing oneself in a new, broader range of movement expression can also lead to a refined perception and interpretation of other people's bodily behavior. By promoting kinesthetic empathy skills as practiced in imitation, synchronous movement, and motoric cooperation, we assume that also emotional aspects of empathy that are grounded in bodily perception and expression, and also some cognitive aspects of interaffectivity such as perspective-taking can be influenced in a positive way.

Moving in and out of synchrony: introducing a new empathy-fostering intervention

Intervention focus and terminology

Based on the presented reasoning, we have developed an empathy-fostering movement and dance intervention that we will apply and evaluate in the near future in a controlled study design, starting with adult volunteers on the high-functioning autism spectrum. The intervention consists of 10 structured units of 90 min per week in a group setting. Pilot sessions in preparation of our study showed the proposed contents of movement and dance to be feasible for both autistic people and typically developed student volunteers with different modifications and structuring of lessons. Even in work with the autistic group, preexisting fears concerning movement and dance decreased, whereas joyfulness and moments of contact and connectedness appeared repeatedly in the movement process.

We are investigating a core set of movement and dance elements that we regard as significant for the intention to enhance empathy and interactive capabilities as prerequisites for prosocial behavior:

Table 1
Terminology of movement tasks as applied in our intervention.

Imitation:	One person watches, then replicates a movement of another person as precisely as possible in body, space, and movement quality aspects, with a delay in time (e.g., time needed to watch another person's movement). Imitation may happen in a homolateral or mirror-converted way. One person is active, the other one is receptive at a certain time.
Synchronous movement:	Two or more people move simultaneously, matched in body, space, time, and quality aspects of movement. Movements may, but do not have to include rhythm or repetition (rhythmic synchrony). Synchronous movement may happen in a homolateral or mirror-converted way (synchronous movement = special case of imitation with additional matching in time).
Motoric cooperation:	Two or more copresent people in motion cooperate to fulfill a common task/goal or to help each other by acting in a coordinated way.

variations of imitation, synchronous movement, and motoric cooperation. We regard the intervention as a chance for participants to experience interactional movement and dance that can be helpful for social interactions, but we do not intend to mechanically train certain movements.

For our research purposes, we would like to introduce a more specific terminology of the three mentioned movement elements, a terminology that differs slightly from the definitions in the previously cited articles on interpersonal coordination in natural settings: In the context of practical movement tasks in our intervention, we will use the terms imitation, synchronous movement, and motoric cooperation as follows (see Table 1).

Components of movement and dance units

On the basis of the dimensions of interpersonal interactions and elements outlined in the theoretical part of the article, we place the main focus for fostering (kinesthetic) empathy on the dimension of reciprocity in bodily/movement interaction. Work to refine the bodily perception and expression of oneself as well as the perception of the interaction partner is also integrated and can be adapted according to the participants' level of those empathy-preceding processes. According to the different dimensions of interaction that we aim to foster – namely, bodily perception, expression, and interaction – we present the following groups and examples of movement and dance elements/tasks to build our empathy-promoting intervention (see Table 2).

Of the movement tasks, the interactive elements constitute – with two thirds of the movement time – the unit's main part; body/movement perception and expression tasks together account for about one third. Verbal exchange and feed-back in a circle build the opening and closing frame of each unit. To facilitate a transfer of movement experiences into everyday life, a short homework assignment in the form of movement, body perception, or movement observation is given at the end of each unit.

Structure and content of the intervention

In this first conceptualization, the structure and tasks of the intervention's 10 units are especially geared toward the needs

of people on the autistic spectrum. Autistic people show some special abilities compared to neurotypical people, e.g., higher general precision (e.g., higher general precision; Dern, 2008) and good systemizing ability that we try to take advantage of in the movement tasks and in a systematic structure. Therefore, each unit follows the same basic structure: It starts with the opportunity for a short verbal exchange and feedback on the homework. A warm-up session in a circle follows, consisting of a joint movement ritual of increasing complexity. The next part, leading to more interaction, is constituted by tasks designed to refine movement expression and perception in everyday movements like walking: This is realized in single and interactive tasks, with a gradual introduction of variations in expression and of contrasting as well as creative elements. The main part of the lesson is constituted by interactive movement and dance elements in increasing complexity: structured imitation and synchronization (of increasing improvisational character, e.g., imitative and mirroring tasks with variations and contrasting elements in different positioning) in dyads or in the group. Motoric cooperation tasks with a common interpersonal goal, consisting of similar or complementary movements (such as in leading and following tasks or the creation of a short, joint choreography) comprise another component of the interactive main part. In addition to improvised synchronous movement, a simple joint dance in a specified choreography is learned and realized by participants over subsequent lessons. The movement part ends with a quiet self-perceptive task to allow for relaxation and self-focusing after the interactive part. Each unit closes with verbal feedback and exchange of the movement experience by participants in a circle in order to promote as well as to integrate new interactive experiences.

For flexible acting in social situations, the (implicit, non-conscious) modulation and adaptation of bodily expression in interactions is of special importance. This automatic modulation and adaptation of movement, posture, and gesture seems to be one of the core problems of people with empathy disorders, especially in autistic people. In the presented intervention, we therefore include not only exact imitation tasks, but also variation and modulation of a given movement by the participants. As an example from one of the later units, a movement observed in the partner is first imitated, followed by a previously practiced variation of the

Table 2
Composition of dance and movement elements in empathy-fostering intervention (prerequisites and core elements).

	Dimension	Characteristics	Examples
Prerequisites	(A) Perception	Elements to refine body and movement perception of oneself and other people	Self-perceptive tasks while sitting, standing, or in motion, observing one's partner's and other people's movements in expressive and interactive tasks (B, C)
	(B) Expression	Elements to promote bodily expressive and creative possibilities	Basic movements such as variations in walking, variations in and contrasting of movements, creating a small choreography
Core elements	(C) Interaction	Interactive elements of interpersonal coordination	
		(1) Imitation	Imitation of one's partner's movements, imitation with modulation/variation (dialogic)
		(2) Synchronous movement (to other people, to music)	Simultaneous mirroring tasks in dyads and in the group (improvised sequences), choreographies of simple group dances (specified sequences)
		(3) Motoric cooperation	Leading and following tasks, creating a joint choreography

same movement or by adding another new movement, thereby starting a “movement dialogue.” As a general concept of the intervention, movement experience and expression by oneself in the presence of others is alternated with moving in coordination with others. With this approach we aim to foster the ability to focus perception alternately on oneself and an interaction partner, as detailed in the theoretical part of this article on bodily dimensions of social interactions. In our conceptualization, joint kinesthetic experiences while moving in and out of synchrony in an appreciative atmosphere and with a mindful attitude are apt to mediate unifying experiences and a sense of togetherness (e.g., in synchronous movement) as well as self-other differentiation (e.g., in contrasting tasks).

The verbal group reflection of personal experience at the end of each unit is intended to promote a lasting integration of movement experiences in everyday life (Marcher, Jarlmaes, & Münster, 2006). Especially for people with difficulties in bodily self-perception or alienation from their bodies, additional verbalization can facilitate the movement experience in serving as a link between movement and kinesthetic experience (Stark & Lohn, 1993).

We hypothesize that the practice of coordinative movement tasks for people with empathy deficits in a group setting has the potential to improve individual expressive variation of movement, empathic abilities and general psychological wellbeing. From a developmental-psychological point of view (for development of the self, see Stern, 1985/2000), interactive movement elements are a rather advanced form of interpersonal engagement and require at least a minimal capacity for reciprocity in the intersubjective relationship, which has to be present beforehand in order to participate in a group intervention. The aim of our intervention is to promote and to further differentiate reciprocal capabilities according to the individual's possibilities, incorporating personal resources.

Discussion and outlook

By reviewing research on perception-action links and coordinated movement elements, we hope to have shown that joint dance and movement have a strong potential to foster empathic and interactive capabilities. We suggest that it is crucial to integrate the bodily dimension of perceptive and expressive processes as part of social interactions in diagnostic procedures and treatment plans for patients with problems with empathy and social relationships. This is especially relevant for people with problems in nonverbal interaction or with their body image. By enhancing and refining kinesthetic empathy within an integrative concept of empathy, we assume that emotional empathic processes and cognitive aspects such as perspective taking can be fostered as well. We are aware that the scientific foundation for this transfer needs to be strengthened by further research in the field of body psychotherapies and empathy research, to which we hope to contribute in the near future by application and evaluation of the proposed intervention.

Although we chose a broad multidisciplinary approach in the outlined conceptualization, there remain some open questions: Nonverbal synchronization processes are probably influenced not only by motoric and kinesthetic aspects, but are also associated with other factors such as personality and attachment style. The impact of those and other factors on empathic interactions needs to be researched further. An additional question remains: How much standardization is possible in an empathy-fostering intervention working with movement and dance? In dance/movement therapeutic contexts, the composition of applied methodology is mostly individually centered with a high complexity of different approaches and a diverse set of methods and techniques, a fact that makes research in the field generally difficult (Loew & Tritt, 2006).

Apart from the momentary needs of individuals, changing group dynamics have to be addressed as well in order to keep participants motivated. In our study, we will have to meet the challenge—already known in psychotherapy research—of finding a balance between simplification and manualization on the one hand and the improvisational application of diverse methods and techniques on the other hand.

We are planning the first application of our intervention with adults from the autistic spectrum. People with Asperger Syndrome have been shown to be impaired in cognitive empathy, but not to differ from controls in emotional empathy in the form of general emotional arousal and concern (Dziobek et al., 2008). In contrast to the so-called broken mirror hypothesis in autistic spectrum disorders, recent research has shown that simple imitation processes show intact functioning, but that relevant problems exist in the modulation and inhibition processes of imitation and higher order integrative processes (Brass, Ruby, & Spengler, 2009; Hamilton, 2008; Hamilton, Brindley, & Frith, 2007). Therefore, for people on the autistic spectrum, emphasis needs to be placed not only on imitation, but also on the refinement of the self-other differentiation in a relationship, which we are pursuing by the modulation and variation of movements as part of imitation tasks.

We are aware of the fact that creative arts therapies (such as dance/movement therapy and music therapy) with autistic people are mostly realized in an individual setting, all the more when the level of social functioning is low. In order to be able to participate in a group intervention, a certain grade of preexisting interactive abilities is required, a reason for why we start our research with high-functioning autistic people. Nevertheless, for people with lower social functioning, a modified application of the proposed contents is surely possible in a small group or individual setting. Within therapeutical contexts, we see the proposed intervention as an additive to other therapy forms. Especially the impact of a long-term therapeutic relationship cannot be replaced by a short-term, structured intervention.

In the future, we plan to investigate feasibility and effects of modified forms of the presented intervention with people with different empathy disorders, also in clinical-therapeutical settings. The program in its core conceptualization is intended to be adapted and modified for different clinical populations, such as patients with antisocial/social conduct disorders and borderline personality disorders. The varying needs of people with different empathy disorders, and the actual level of functioning of the participants can be considered by shifting the emphasis of the different presented components of the program (e.g., varying the emphasis on perceptive, expressive, or interactive tasks) and by inserting additional elements that have proven to work well for specific clinical populations. In adapting dance styles and the selection of music according to the preferences of participants, the intervention can also be tailored to different age groups, including children and teenagers in child and adolescent psychiatry settings.

Further research is needed in the field of body- and art-based psychotherapies in order to design diagnosis-specific interventions. In order to be able to formulate individual indications for dance and movement therapy and to design integrative treatment plans for people with problems in empathy and interpersonal relationships, also a pretherapeutic assessment of empathic abilities and prerequisites of empathy (mentalization level, quality of relationship, bodily perceptive and expressive abilities, etc.) should be developed. With insights from a first evaluation study of the presented intervention that we will undertake in the near future with people on the autistic spectrum (for study design, intervention details and results see future publications), we hope to contribute to some aspects of the development of special dance and movement interventions for people with problems in social interaction in order to foster empathy and interactive abilities.

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