Inside the Mirror

Effects of attuned dance-movement intervention on interpersonal engagement as observed in changes of movement patterns in children and adolescents with autism spectrum disorder

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A thesis submitted to the University of Hertfordshire in partial fulfilment of the requirements of the degree of

Doctor of Philosophy

September 2015

To Marthe, Ben and Eva

Acknowledgements

I would like to express my first and deepest gratitude to the children, adolescents and parents who participated in this project. Through sharing their dances, their thoughts and their feelings they gave me the opportunity to take part in their ways of moving and being moved. I feel deeply touched by their trust and commitment.

I would like to thank my principle supervisor professor Helen Payne, for her welcoming attitude at the start of my research journey and for her trust and the encouraging words she offered throughout the years of my PhD project. Her patience and guidance have been of great support during times of uncertainty and her constructive comments to my research choices offered the freedom to develop my own ideas within the academic frame of thinking. I would also like to thank my second supervisor, dr. Ben Robins, for his optimism and humour when things got stuck and for his helpful challenges during discussions, by which I felt supported to take a creative and constructive approach to academic structures. The connection between academic research and thinking from the arts that both my supervisors combined in their work has been very inspiring to me.

I would like to thank professor Christian Keysers, who was on the supervisory team in the first years of the project and who supervised the initial fMRI design. I am also grateful for the support I received from dr. Lawrie McKay who was of great help in designing the scanner tasks and piloting the procedures.

I am very thankful to the Dutch colleagues at ORBIS GGZ, who for so many years already have shown a professional faith in what dance therapy can do and who have supported the research work in the clinic in so many ways. Special thanks go to Maarten Moonen and dr. Anita Wydoodt, who helped with the implementation of this research in the clinic. For the onsite mentoring I would like to thank dr. George Westermann, who has always been willing to comment, discuss or offer advice. I would like to thank Wim Bisschops for his willingness to serve as the clinic's independent medical advisor. I thank dr. Bernd Grimm for commenting on the statistics.

My sincere thanks also go to my fellow Dutch DMP colleagues, for their genuine interest in the project and for the many opportunities to discuss and analyse the specific nature of our work. A special thank you goes to Ina van Keulen, Simone Kleinlooh, Nicky Wentholt and

Ciel Weerts for their ongoing support throughout the project. Several colleagues participated as movement analysts in this study, I would like to thank them for their patience during the training and annotation stages, and for their willingness to contribute to this project and share their professional views on the matter.

I would like to thank the DMP students of Hogeschool Zuyd who contributed to my learning about dyadic movement interventions in the expert movers workshops. Many of them also participated in the realisation of video-samples for the originally envisaged fMRI study. Special thanks go to Eefje Schoonewille, Lucia Bakker and Anouk Ronkaars for their help and support in logistics and origanisational tasks during various stages of this project.

I feel grateful for the responsiveness of DMP colleagues from the professional field dr. Iris Bräuninger, dr. Robyn Cruz, dr. Dianne Dulicai and dr. Hedda Lausberg, who offered literature suggestions on movement analysis. I am very grateful to dr. Han Sloetjes from the Max Planck Institute of Nijmegen for his introduction to the ELAN software and for his expert help in developing the movement annotation templates.

I wish to thank my family for the deep connections we were able to maintain over the years, while living in different countries; for their curiosity in listening to the stories about the adventures throughout this research journey and for their willingness to change plans when schedules got overloaded. Karin and Ralf, I felt supported by your loving care for our mother throughout the years and I feel very grateful for that.

This research would have made me very lonely, had there not been many dear friends, who were there throughout all these years. Even in times when I had nearly disappeared from the scene, it turned out that they were still out there on my return. Thank you for that.

To my husband Arno Goudsmit I feel a sincere gratitude for sharing his love and endurance throughout these very busy years. His confidence in my work and his prudent comments helped me in writing this thesis. The vivid discussions on many occasions along the research path challenged my thinking and supported my wording of the kinaesthetic knowns.

I am dedicating this work to our children Marthe, Ben and Eva, who have been helpful and supportive in many ways with their mother's research struggles, and who above all, by coming into my life, have taught me about the deep matter of attunement.

Abstract

The research presented in this thesis is an explorative study into the basic concepts and the effects of dance movement psychotherapy (DMP) intervention on the attunement behaviours of children and adolescents with autism spectrum disorders (ASD).

From a retrospective analysis of positively evaluated single cases of DMP with ASD participants, movement markers of interpersonal relating behaviours have been formulated in terms of Social Engagement and Attunement Movement (SEAM) behaviours. These were organised into an observation scale, and used subsequently to generate nominal observation data on the behaviours of a small sample of children with ASD. Evaluation with the SEAM observation scale yielded a significant increase of SEAM behaviours in the course of the dance therapy.

Retrospective analysis of the actions of the therapist throughout four single cases of DMP with ASD participants yielded a specific approach that was described as Shared Movement Approach (SMA). SMA has been specified as an improvisation based method of DMP that takes the child's interpersonal attunement and engagement behaviours as cues for the therapist to accommodate her interventions, so that the child's interpersonal relating behaviours are facilitated and supported. Through her kinaesthetically informed interventions the DMP therapist contributes to an increase of interpersonal engagement and attunement by the ASD participant from within the shared movement actions.

The SEAM observation scale was explored on conceptual clarity and consistency in a group of independent movement analysts, and interrater agreement was used as an indication of its contents validity. An interval rating procedure with the SEAM scale yielded the best results on interrater agreement as expressed in Cohen's kappa.

The Shared Movement Approach and the SEAM observation scale were then tested for replication of outcome on SEAM behaviours within four repeated single subject cases in a pilot study in a Dutch outpatient clinical setting.

The outcome monitoring yielded the replication of increase of interpersonal relating behaviours as measured with the SEAM observation scale. Within subject therapy outcomes, although diverse in their individual profiles, were found to be significant when analysed with non-parametric tests. Group averages showed a significant increase of SEAM behaviours.
The effects beyond therapy were evaluated with the somatic and social sub-scales of the Child Behaviour Checklist (CBCL) and the Social Responsiveness Scale (SRS), showing individual differences and a significant problem reduction on average. The outcomes as experienced by the juvenile participants were evaluated with the somatic and social sub-scales of the Youth Self Report (YSR), which on average showed a significant decrease of experienced social and somatic problems.
The results obtained are discussed in view of current theories on experiential approaches and concepts for psychotherapy with an ASD population.

Keywords: autism, dance movement psychotherapy, movement observation, interpersonal attunement, enactive intersubjectivity, kinaesthetic partnering.

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ASD	Autism Spectrum Disorder
BRIAC	Behavioural Rating Inventory Autistic Children
CBCL	Child Behaviour Checklist
DMP	Dance Movement Psychotherapy
DSM	Diagnostic Statistical Manual
ELAN	EUDICO Linguistic Annotator
Excel	Spreadsheet program from Microsoft
KMP	Kestenberg Movement Profile
LMA	Laban Movement Analysis
MNS	Mirror Neuron System
MPI	Movement Psychodiagnostic Inventory
SEAM	Social Engagement and Attunement Movement markers
SMA	Shared Movement Approach
SPSS	Statistical Package for the Social Sciences
SRS	Social Responsiveness Scale
YSR	Youth Self Report

Contents

Chapter 1

Introduction

He was looking around, working through the props lying around. Finding his way towards centre of the space. Not looking at her, not talking to her, not knowing what to do. She too was picking up a pendulum ball. They both were swaying the pendulum around themselves, each in their own world.

This study had its offspring in the professional experiences of the researcher as a dance movement therapist in a Dutch Mental Health Service. The researcher has worked for many years as a therapist with clients with autism spectrum disorders (ASD) in dance movement psychotherapy (DMP). Interestingly, the children and adolescents came to be partners with the therapist in shared movement activities. They enjoyed the shared movements as did the therapist, and they enjoyed to share their engagement with her. These children were said not to be communicative or not to relate and regulate themselves well in the interactions with others, and they came to do just these very things during DMP. How could that be? What happened in the dances shared with the therapist that made them relate to the therapist as a second person? What happened during the movement experiences that made them take these newly found forms of relating with them to situations outside the therapy?

Although not yet widespread, DMP is one of the interventions offered in a multidisciplinary outpatient programme for therapy and psycho-education for children and adolescents in the Netherlands. The children who come into these services usually live at home and follow

special education, specifically tailored for the ASD population. They are referred to outpatient mental health services by their general practitioner (GP) or by the school's health services.

Younger children who have not been in mental health care before usually come into the service because parents or other caregivers have concerns about their general social or emotional development. They are diagnosed in child psychiatric interviews and psychological diagnostics during the intake procedures. Older children and adolescents may already have an ASD diagnosis and usually come into the service with more specific concerns regarding their social or emotional development, like for instance difficulties in their regulation of emotions or difficulties to engage and maintain social relations.

After the intake procedures have been completed a treatment programme is proposed to parents and child. DMP is one of the interventions offered besides other forms of therapy and psycho-education programmes. Usually parents are closely involved in the treatment process of their child.

> *He was turning towards her now, could see her move towards him. He followed her moves, he was meticulously avoiding letting her come closer. The swaying helped though; kept her at a distance, keeping the space around him free, for no other to intrude.*

Children are referred to DMP when an experiential approach is thought to be appropriate. In the referrals to a non-verbal therapy approach two domains of problem causes can be discerned, a weak sensory-motor integration or weak skills in the interpersonal communication within a verbal context. The DMP therapist will seek to assist the child to develop towards engagement with the other and deepen the nonverbal interpersonal relating.

Routine outcome monitoring is part of the treatment structures in Dutch outpatient NHS. The monitoring instruments, mostly questionnaires for mental health professionals or parents and caregivers, are without exception verbal instruments. The experiences that are at the core of a non-verbal therapy are not investigated by means of these instruments. Nevertheless, the outcome monitoring after DMP intervention shows relatively positive results.

Anecdotally over the years, caregivers and participants reported positive outcomes of DMP intervention on the social behaviour of children and adolescents with ASD. It was found that children with ASD adjusted more easily to the non-verbal behaviours of others than they did before DMP intervention. Caregivers described that their child seemed to be better able to regulate actions and seemed less arousable. Adolescents found themselves less stressed. Children and adolescents found it easier to adjust to the actions of others during sports and play situations. The therapist's outcome evaluations also reported improvements in sensory-motor organisation and improvements of attunement during movement interactions with a partner. As a consequence of these changes, it seemed that the child's capacities to maintain contact and relationship by intentionally regulating towards another person's movement patterns were increased. These changes have been reported from the children's interaction with their therapist, their interactions with parents and other caregivers during outcome evaluations and they were supported by video-observation.

> *When she approached him he started to move through the space, keeping her at a distance. Now he was swaying his pendulum with more strength towards her. Sweeping her to a distance, yet finding a same rhythm as her's. Good distance, though somehow connected, but not intertwined, strong in his own zone. He could sweep her away into a far distance now, not giving up his own territory, and she backed off a bit, but still he could see and hear her movement, which was at a (be)fitting span now.*

All the reported outcomes are related to forms of self-regulation and forms of attunement to the context or to a partner. Other DMP therapists have given similar outcome evaluations, as has been documented in many published and unpublished case histories of DMP with children with ASD. Therapists describe better movement performance and body organisation (Erfer, 1995; Hartshorn et al., 2001) as well as an increase of movement interactions from the child towards the therapist (Loman, 1995; Loman & Foley, 2003).

Since Meltzoff and Moore (1998) had shown that already new-borns imitate the facial expressions of an adult, developmental psychopathology related social attunement to the ability to imitate. Imitation was considered the base of empathetic attunement to another person. As imitation enables the child to feel through its own action the action of the other, it may help the child to know from its own action experience how it feels to act like the other does. Since then many researches in the area of autism focused on the ASD child's capacities to imitate.

> *"Come said Onima let's go to the forest – which forest? asked Peter. The forest of all the wild beasts! Okay said Peter let's go…"*[1]*. He takes her hand and hops around her – perpetuous movement around, around, around – telling her the story of the wild beasts…around and around 'till he sways at her arm around and around to the ground…*

Many DMP's adopted the imitation based theories on empathy. Imitating actions was considered quite similar to *mirroring,* which has been a widespread intervention among DMP's working with children with autism ever since Janet Adler (1968b) published her famous film 'Looking for me'. When the capacity to imitate was linked to the functionalities of the putative mirror neuron system (MNS) in the 1990s, dance movement therapists felt

[1] In these inserted miniatures from therapy sessions the formulations between quotation marks follow the child's literal formulations.

strongly attracted to these concepts. The functionality of the MNS was taken as an explanation for the impact that mirroring interventions had on the child with ASD (Berrol, 2006; Koch, Mehl, Sobanski, Sieber & Fuchs, 2014; Behrends, Müller & Dziobek, 2012). Also it was hypothesised that mirroring interventions could develop empathy in children with ASD. However, the claims have not yet been studied in detail. Also it has not become clear whether imitation is really at the core of the mirroring intervention. Most DMP's describe mirroring as an attitude that is not so much imitating as well as matching the participants' movement behaviours. The concepts and understandings of imitation and mirroring seem to cover a spectrum of activities, which makes it difficult to compare the claims.

In the last decade there is a growing need in the clinical field to develop theoretical concepts that enable DMP's to describe their professional practice, to explain their specific interventions and to interpret therapy outcome in terms that could speak to other professions as well. Furthermore the development of guidelines for medical care programmes impose declarative structures upon the profession that have not been common practice in DMP, which is traditionally rooted deeply in the arts therapies and in creative cultural practices.

The researcher's personal journey into this research started with the need to explain and clarify what was happening in therapy. Effects that were found in the clinical practice had not yet been studied systematically. An imbalance could be felt between the experiential dimension of the dancing with ASD participants in the therapies and the theoretical conceptualisation of these processes. Theory did not provide satisfactory explanatory models. The initial searches yielded a couple of papers that obviously were written from a same experiential background, but that did not provide a theoretical frame of reference for what happened between therapist and ASD child.

Early in the research work it was considered that knowledge and insight would not come from an external perspective. Studies that had been conducted in university laboratories often did not contribute to the reality of clinical therapy practice. Findings from a controlled setting often did not match the dynamics of the living process that clinical therapy is. A pivotal consideration was that knowledge should therefore be developed preferably from within the context of clinical practice. This, however, turned out to be a very demanding route. It has been a challenge throughout this research to match the dynamic system of clinical work with a research stance that takes into account the dynamic phenomena at hand, but at the same time seeks to develop empirical understanding.

Taking the experiential description of therapy outcome as given above, knowledge about the processes at work may be derived from the exploration and examination of interactions within the therapeutic relationship between client and therapist. The changes within the movement interactions between participant and therapist within the setting of therapy reflect the changes of the child's intersubjective nonverbal engagement in its everyday life's contexts.

An exploratory pilot-study would enable a first investigation into the intersubjective attunement as it is seen in the therapeutic relation in DMP. Movement patterns and the development of kinaesthetic structures between therapist and ASD participant in DMP may serve as the territory to explore the ASD child's non-verbal attunement behaviours.

> *"How can we find the way through the forest? Oh wait – let's make a map. Where did we walk? This path… or that one? Here, here we've passed the bridge – and here we have passed the river…and now, here we are, in the forest finally … the map will show us the way…".*

The initial research questions followed directly form the clinical experiences:
How could the increase of social attunement after DMP intervention be explained?
Which methodological frame of reference would be helpful to investigate the effects of DMP intervention in ASD? How could the up to now intuitive outcomes of the clinical intervention be measured?

From a first exploration into the domain it was initially envisaged to conduct a study that also included techniques from neuro-science research. The clinical outcomes referred to functionalities of the putative mirror neuron system. The hospital where this research has been situated was found willing to fund a pilot for an fMRI study. Unfortunately, due to organisational issues, the funding was not continued after the first year. The fMRI study could not be continued beyond the piloting of the fMRI design. The project plan for this study is attached to this thesis in Appendix 13.

When the initial plan could not be followed, the research path was reassessed.
The initial question did not change, but, as the advanced measurement of neuronal activation would not be available, the outcome measures had to be reconsidered.
A central problem was the question how to pair the natural situation (clinical experiences) with the systematic observation (research data). As the natural situation of developmental DMP was the dyadic intervention, means had to be found to look into the intervention without disturbing the natural dynamics of the therapy context.

In order to assess more than one clinical case it was necessary to replicate the outcome of the clinical intervention in repeated single cases. Furthermore, for empirical evaluation, it was necessary to answer the question how the outcome of DMP could be measured in observable behavioural features and show these very elements in replication.

The dialogue with colleagues from the professional field in the Netherlands was an important source of inspiration and support throughout the research period. It was their expectation that a study on the effects of DMP intervention on non-verbal relating in adolescents with an ASD would not only have an impact on the research population, but could also be of value for training programmes for DMP's, in that the study might be helpful to better specify the therapeutic intervention itself and make it applicable for a broader DMP community.

For the initial version of the literature review, searches were performed via PubMed and the journal sites of ScienceDirect, Sage Journals, SpringerLink, Wiley InterScience and Oxford University Press. As the sources on DMP are limited, a long time period was used. Searches for the first research plan started in 2008. They have been revised for the current project as of 2012 and they have been updated until May 2015. The following search terms were used in combination with 'autism': 'social engagement', 'attunement', 'social orienting', 'dance movement (psycho-)therapy', 'mirror neurons', 'empathy', 'imitation' and 'interpersonal relations'.

Additional searches were performed on neural correlates of social behaviour, which led to further differentiation of aspects: action recognition in human movement and the role of movement synchronisation in social interactions Body-informed models of intersubjectivity were found to match well with neuro-biological findings on mirror neurons.

These searches have been supplemented with literature found in the references of the American Dance Therapy Association's (ADTA) member directories on 'DMP in ASD', and on 'DMP and mirror neurons'. Finally, all materials found were related to theories on the development of intersubjectivity and interpersonal relatedness in autism. The literature searches then concentrated on body-informed models of intersubjectivity in autism.

Non-verbal interaction and attunement in autism has been related to a number of complex and layered domains. The synergy of these domains is not a linear procedure but has to be understood as simultaneously active. Literature on these domains was covered for this research in view of non-verbal attunement in ASD with a focus on the connectivity between the domains.

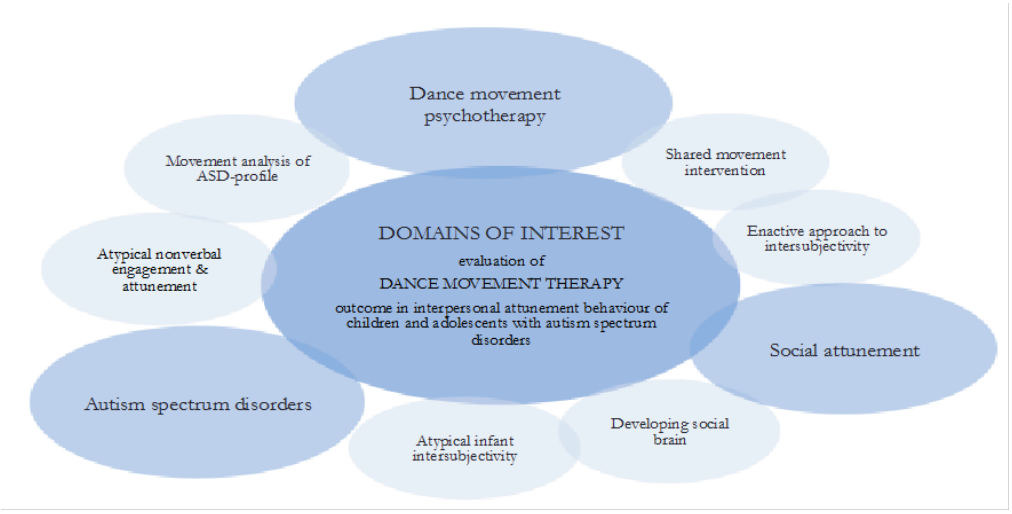


Figure 1: Domains of interest for the current study

The research was conducted in a series of four studies, each of them with their own structure, themes and methodology. Therefore it was decided to present each study in a separate chapter. The overarching methodological considerations and choices will be presented in the methodology chapter (chapter 3). The more detailed methodological choices and specific aspects will be presented in the respective chapters.

After the four studies have been worked out more in detail, the results will then be summarised and discussed in an integrative chapter (chapter 9) that will close with the integrative conclusions of this research project.

The outline of the thesis is as follows:

Chapter 2

The chapter reviews the literature on social relating in ASD and investigates the research in DMP with ASD. The understanding of the condition as presented in the literature was the point of departure for an exploration into the domain of autism spectrum disorders. When more specific literature searches were started it showed quite soon that there was only a small amount of studies that specifically targeted DMP research. The searches were therefore broadened to domains found related to themes that occurred in the papers on DMP in autism.

Chapter 3

This chapter outlines the overarching methodological considerations and choices for the project as a whole. From this the specific aspects per study are described and the composition of the four separate studies are presented.

Chapter 4

This chapter covers Study 1. It shows how interpersonal movement potentials were obtained from retrospect analysis of DMP and how these obtained markers were then structured into a movement observation scale.

Chapter 5

The chapter covers Study 2. It shows the retrospective investigation of DMP as intervention in ASD, from video samples of clinical DMP cases. The interventions of the therapist were analysed in view of how they contributed to the movement relation with the ASD participants.

Chapter 6

This chapter reflects on the research path. The specific aspect of being a therapist-researcher is reflected upon and describes, from a first-person perspective, the impact of research activities on clinical practices as well as on the therapist-researcher's own understanding of how to reflect upon (shared) movement structures.

Chapter 7

This chapter presents Study 3. It shows how movement data taken from visual material (video) can be related to movement specific experiential calibration. This chapter investigates the interrater agreement on observations with the SEAM observation scale.

Chapter 8

This chapter investigates the usefulness of the SEAM observation scale for outcome measurement of DMP intervention. It presents a small set of N=1 DMP cases conducted in the Shared Movement Approach with adolescents with ASD. The outcome of SEAM observations is compared to outcome measures of validated questionnaires on social relating that are in use for outcome evaluation in Dutch NHS.

Chapter 9

This chapter summarises the results of the four separate studies. It offers an overview and a discussion of the results.

Throughout the thesis the participants are not always indicated with the diagnostically specification of ASD. This is due to the fact that the clients are not perceived in terms of handicaps or pathology. Instead, they are viewed and appreciated as a partners in the shared enterprise of creating a meaningful therapy. Within the context of DMP interventions as they were conducted for the purpose of this study, participants have at no point been asked to

behave in a specific way or to fulfil specific tasks. To the contrary, it was the spontaneity itself of the participants' interpersonal movement actions that constituted this research project's focus of interest.

Accordingly, an intersubjective stance with the participants was essential throughout this study. They were not the objects of a researcher's investigation, but rather duet partners in dyadic movement improvisations. The shared movement improvisations that arose offered the movement material to investigate social orienting, social engagement and social attunement in ASD.

Also, throughout this thesis, no differentiations are made of the diagnostic classification into subgroups like PDD-NOS, Asperger etc. With the introduction of DSM V (APA, 2013) the categories have become revised, so that now all children and adolescents who participated in this study are classified in the global category of *autism spectrum disorder*..

Chapter 2

Social attunement and engagement in autism spectrum disorders[2]

"Reaching out, making connections
Looking for friends and new directions
Exploring new places and meeting people
Moving forward and looking for life's next sequel"
(Scott Lentine, 2015)

2.1 Introduction

This chapter will review the research literature on social relating in autism spectrum disorders (ASD) and will investigate the research on dance movement psychotherapy (DMP) in autism spectrum disorders.

2.2 Autism: an exploration into the domain

Leo Kanner (1943) was the first to describe a clinical condition he called 'infantile autism'. He described observations of children who showed a strong tendency to be on their own,

[2] This chapter is an extensively adapted version of a paper published in *The Arts in Psychotherapy,* Samaritter & Payne (2013).

with little or no communication with their caregivers. These children seemed to be absorbed in stereotyped movements, perseverating in sameness. Nowadays the Diagnostic Statistic Manuals (DSM V) of the American Psychology Association (APA) and the International Classification of Diseases and Related Health Problems (ICD-10) still consider social-emotional withdrawal as core symptom of the condition. Autism is described as a developmental disorder with a cluster of markers in i) diminished ability to communicate, ii) reduced social functioning, and iii) preference for stereotype routines (WHO, 1992; APA, 2000). A broad variety of appearances is known to fit into these core markers. Classification system DSM differentiated as far as version IV-TR into Asperger syndrome, pervasive developmental disorder (PDD), childhood disintegrative disorder (CDI) and RETT's syndrome. To cover this variety, the term autism spectrum disorders (ASD) was introduced, it indicating a psychiatric condition that shows disturbances in each of the three described domains. In the DSM V (2013) the differentiation into subtypes as Asperger and Pervasive Developmental Disorder has been left in the favour of one category, Autism.

The number of children diagnosed with ASD seems to be growing. Epidemical studies give a prevalence 1 % of children in the UK (Baron-Cohen et al., 2009). However, other studies indicate only mild increases in the prevalence rates (Chakrabarti & Fombonne, 2005). The increase might be due to more specific diagnostic criteria. For the Dutch population the prevalence numbers lie at 60 to 100 per 10,000 children, against 25 per 10,000 in 1966 (Nederlands Centrum Jeugdgezondheid, 2011). These numbers might change with the revision of the criteria in DSM V (Baxter et al. 2014).

Causes of ASD are multi-layered (Baron-Cohen, 2004) and still not clearly identified in their interplay. Genetic conditions as well as atypical neurological structures have been described as leading towards ASD (Folstein & Rosen-Sheidley, 2001; Jamain, Betancur, Giros, Leboyer, & Bourgeron, 2003; Jamain, Quach, Betancur, Rastam, Colineaux, Gilberg et al., 2003;

Philippe, Martinez, Guilloud-Bataille, Gilberg, Rastam, Sponheim et al., 1999; Szatmari, Paterson, Zwaigenbaum, Roberts, Brian, Liu et al., 2007). Cases of ASD due to affected biochemical reactions in neurotransmitters have been reported after immunological problems (Herbert, Ziegler, Deutsch, O'Brien, Kennedy, Filipek et al. 2005; Herbert, Ziegler, Makris, Filipek, Kemper, Normandin et al., 2004). It is generally assumed that interactions of hereditary, neurobiological, developmental and environmental characteristics and structures play a role in the development of autism.

Of all the dimensions in the appearance of autistic traits that of diminished social relating is probably the most significant. Atypical development of social engagement, empathy and formation of theory of mind are core markers throughout all phenotypes (Bennetto & Rogers 2001; Aitken, 2008). Currently researchers agree on an integrative view on origins of ASD (Gallese, Keysers, Rizzolatti, 2004; Belmonte et al., 2008; Gallagher, 2008; Bastiaansen et al., 2011).

2.3 Interpersonal engagement in ASD: the relational dyad

Parents of children who are later diagnosed with ASD signal atypical interpersonal engagement of their children already quite early in development (Baird et al., 2001). Caregivers experience limited interpersonal exchange like eye-contact and imitation of facial expressions or simple body movements. Often they report in retrospect or in comparison with siblings a limited attention to shared activities like synchronising, pointing to ask for an object, joint attention or hand clapping games (Rogers & Williams, 2006). In a retrospective study of 1st birthday home videos Osterling & Dawson (1994) have shown that infants later diagnosed with ASD attended less to other people, they did not orient when called by their

name and did show less interest in the activities that require joint attention activities than typically developing children and children with mental retardation.

2.3.1 Social Cognition

Mainstream theories represented in the three following models in the 1980's and 1990's focussed on the atypical social development in ASD from a perspective of social cognition. In this domain, three theories formed a layered account to social cognitive deficits in ASD.

Theory of Mind (ToM) (Baron-Cohen, Leslie & Frith, 1985; Gallagher, Happé, Brunswick, Fletcher, Frith & Frith, 2000; Baron-Cohen 2003) focusses on the cognitive strategies that enable the child to ascribe mental processes to others and to predict other peoples' behaviour. Impaired ToM would result in impaired mentalisation tasks. The ability to take into account another person's interests, states, thoughts, feelings has been shown to be weak in autistic individuals during behavioural and mentalizing tasks.

The weak central coherence theory (Frith, 1989) holds that individuals with ASD tend to process information on details more precisely and strongly than information about the whole. In social situations the ASD child doesn't pick up the contextual information and tends to interpret information in a quite literal way.

Executive functioning theory (Ozonoff, Pennington & Rogers, 1991) explains behavioural characteristics in ASD like rigidity in action patterns, need for repetitive actions and sequences as regulating actions that compensate for a lack of (cognitive and executive) regulation during attention and action tasks.

Results from various studies have shown evidence for these theoretical approaches. Many intervention programmes have been tailored to support the social cognitive development of the child with ASD. As the explicit theoretical focus is on deficits of cognitive pattern formation in ASD, these interventions usually follow a structured approach to train the ASD child's social engagement towards typical social engagement.

The question as to which specific ways children with ASD might develop towards social orientation and interpersonal relating is not answered by these theoretical approaches.

2.3.2 Social neuroscience

The possibility of brain imaging techniques intensified the research into the neuro-biological aspects of ASD enormously during the past 15 years. This is also reflected in the growing amount of studies on (putative) atypical brain mechanisms underlying interpersonal engagement behaviour in ASD (Gallese Keysers & Rizzolatti, 2004; Williams, 2008; Rizzolatti, Fabbri-Destro & Cattaneo, 2009). Atypical patterning in the processing of motor information during social acts has shown atypical mirror neuron system (MNS) activation in children and adolescents with ASD (Dapretto, et al., 2006; Iacoboni, 2009; Pineda & Ramachandran, 2007; Oberman, Hubbard, McCleery, Altschuler, Ramachandran & Pineda, 2005; Iacoboni & Dapretto, 2006). These studies have been discussed intensively in the field (Raymaekers, Wiersema & Roevers, 2009; Pineda, 2008; Dinstein, Behrman & Heeger, 2008). The broad variety in task design makes it difficult to compare the results. Tasks during action observation and action execution vary from goal directed motor tasks to pantomime imitation tasks. A wide range of sensory-motor and proprioceptive properties as well as mental representations of interpersonal engagement might play a role in the outcomes. Participants' age ranges differ very much. Longitudinal brain and motor development might also have an influence on task performance. A study with adults with ASD of Bastiaansen

and colleagues (2011) showed an age dependent activation in premotor cortex (BA44) with a tendency towards TD profile, which in other studies had been found atypical hypoactive in children with ASD (Dapretto et al., 2006).

From a DMP perspective these are interesting findings as the mirroring interventions that are broadly used in DMP are thought to support activation of the brain mechanisms involved in the MNS (Berrol, 2006; Winters, 2008; Homann, 2010; McGarry and Russo, 2011). Dance activities seem to address the specific functionality captured by the MNS: the combination of action observation and action execution in the very same moment. In DMP, like in dyadic communication the non-verbal intention of the dancer is addressed towards a partner. Intentionality of action can be perceived in the shared movement themes. Moving together thus has a direct social component (Gallagher, 2008; Catmur, 2015).

In studies with dancers the observation of expressive movements led to MNS activity. The expert dancers showed stronger brain activation when watching a movement style that matched their own training background (Calvo-Merino, Glaser, Grezes, Passingham & Haggard, 2005). The dancers' proprioception was activated more while watching familiar movements. Movement experiences seem to contribute to plasticity in the involved neuronal circuits (Calvo-Merino, Grezes, Passingham & Haggard, 2006; Kirsch, Dawson & Cross, 2015). This might support the hypothesis that MNS could be looked upon as an inherited potential of the human brain that can develop throughout life by experience.

However promising these studies may be for the understanding of interpersonal attunement and interpersonal engagement, the contributions on MNS activation for individuals with ASD as for neurotypicals, up to now lack a consistent psychological model on the interplay of sensory-motor functions and interpersonal relating. A theoretical model would need to

take into account how embodied interpersonal relating develops throughout childhood and adolescence in typically developing children as well as in ASD.

2.3.3 Developmental perspective

The interpersonal attunement between infants and their caregivers has been a focus of developmental psychology since the 1960s. Margaret Bullowa (1979) was one of the first who reported extensive studies on the pre-linguistic patterns of parent-infant-communication. She found that attention towards a caregiver could be traced by following the child's orienting movements and gaze (ibid.). She discovered that changes in the intention of the child were indicated by a change in motion. With a continuous undifferentiated bodily state in the child, caregivers would feel no signal to connect with the child. She documented this motion-oriented perspective in series of photographs of mother-infant-interactions.

Trevarthen (1998) carried on in this type of observation and set a theoretical frame of reference for person-to-person interactions in infancy. He studied the movement patterns that child and caregivers used to attune to one another. He found both, child and caregiver active agents in this process and described it in psychological terms as unfolding rhythmical patterns and mutual phrasing of interaction. He called these early attunement activities primary inter-subjectivity (ibid.).

Imitation was found to play a prominent role in the interpersonal exchange in the early dyad. Meltzoff and Moore (1998) showed that new-borns are able to imitate facial expressions of adult communication partners already a few hours after birth. It was proposed that the neonate was born with a cerebral representation of the other which enabled him not only to

recognise species and animate interactive behaviour, but also to match a visually perceived facial expression with a motor imitation of that very impression (Meltzoff & Decety, 2003).

Bateson (1979) introduced the term "proto conversation" to describe the early voicing "dialogues" between mother and child. Proto conversations were understood to be precursors of language. For the interpretation of the early video-studies semantic structures were used to explain the early non-verbal attuning processes between mother and child.

From the primary interrelating the mother-child-dyad develops towards secondary inter-subjectivity (Trevarthen & Hubley, 1978). In the secondary intersubjective exchange the child is able to take the other into account as an intentional being (mentalisation). Co-operative interplay between child and caregiver like joint attention and other forms of person-person-object awareness develop in this phase. They are understood to form the basis of 'theory of mind' (Meltzoff & Gopnik, 1993).

In clinical observations autistic children seemed to imitate less frequently than typically developing children. From these observations Rogers and Pennington (1991) developed the theory that autism might be rooted in impaired imitation in early attunement processes. This entails, in consequence, further social-communicative impairments in later developmental phases, like the disability to mirror and share emotions or to empathetically relate to others.

Further studies on imitation in autistic children showed that children with ASD performed as well as typically developing children in imitation tasks with complex goal-directed actions, but were significantly different in their imitation of the style in which the actions were performed. Also spontaneous imitation was less observed in children with ASD than typically developing children (Rogers, Bennetto, McEvoy & Pennington, 1996; Rogers, Hepburn Stackhouse & Wehner, 2003; Rogers & Williams 2006; Hobson & Hobson 2008).

The focus on imitation did not take into account the interactional (movement) dynamics of interpersonal relating. Rhythmic qualities of dyadic interaction had been described already before (Bullowa, 1979; Trevarthen, 1998; Kestenberg, 1975; Stern, 1985) and have been investigated in autism as well (Amos, 2013; Trevarthen & Daniel, 2005).

The early dyadic interplay between infant and caregiver have often been compared to a dance (Stern, 2002; Kalmanson, 2009; Bråten, 2007), which reflects the role of nonverbal attunement qualities that are developed in the early dyadic interplay between infants and their caregivers. Jaffe, Beebe, Feldstein, Crown & Jasnow (2001) and Beebe and colleagues (2010) analysed the rhythmic changes in this early embodied dialogue into detail. They showed that embodied rhythms developed in the early dyadic interplay continue to accompany communication patterns throughout life-time (ibid.). As for the population with ASD there are just a small number of papers that specifically focus on e.g. rhythmic synchronisation or rhythmic turn-taking - both aspects of the early dyadic interaction (Amos, 2013).

2.3.4 Consequences of atypical interpersonal engagement

Little research could be found on the consequences of atypical social engagement for the social-emotional development of children with ASD. In the Netherlands, Buitelaar (1995) investigated attachment patterns in ASD children and their caregivers.

Developmental psychologists focused on the impact of interactional and environmental factors on the social development of the child with ASD (Wimpory, Hobson, Williams, & Nash, 2000; Rogers & Williams, 2006; Hobson & Lee, 2007; Hobson, Lee, & Hobson, 2007; Wimpory, Hobson, & Nash, 2007; Williams, 2008).

Also the impact of atypical engagement for the parenting strategies of caregivers has not been investigated in depth. In a developmental perspective the described dysfunctions might as well be caused by retardation or a developmental gap (Alvarez, 1999). Early detection of pathology facilitates early intervention and with that the impact of the inherited factors on the child's development might be reduced (Belmonte et al., 2008).

From a developmental perspective one might say that from atypical (biological) structures in early interactions with children with ASD a gap or retardation/atypical development in the emerging interpersonal engagement and attunement will consequently follow due to the lack of (relational) experience (Stern, 1985, 2010). A single study has shown that the interactive behaviour of caregivers of children with ASD alters with a tendency towards flattening. In studies on home-videos early atypical attunement between children with ASD and their caregivers have been found, with a tendency towards flattening in the interactive behaviour of caregivers towards the child with ASD (Wimpory et.al., 2000; Wimpory, Hobson & Nash, 2007). Studies on gestural interpersonal engagement during interviews with adolescents with ASD showed appropriate use of gestures, but the feeling of intersubjective exchange in the communication partner differed significantly between the groups of typical and ASD adolescents (Garcia-Perez, Lee & Hobson, 2007). Thus the ASD structure not only affects the development of interaction skills in the child but it also does affect the environment's responsiveness towards the child. The dyadic communication and interplay ends up with a double retarding impact.

In the research studies on spontaneous gestures of social engagement autistic children and adolescents were offering less spontaneous verbal and non-verbal gestures of greeting and farewell. Autistic subjects less often responded with eye contact when offered a greeting, fewer children smiled when waved good-bye (Hobson & Lee, 1998).

Hobson (1990) suggested that the development of an interpersonal self might be impaired in autism. He points out that autistic children do not develop a concept of self, as they "fail to be aware of themselves in the minds of others" and "fail to understand the nature of other persons who have their own psychological orientation toward the world." (ibid., p. 174).

2.3.5 Intervention-based research in the ASD dyad

Dawson, et al. (1998) showed that children with ASD failed to orient towards social stimuli. They showed that social orienting behaviour like gaze increased in children with ASD after their mothers had imitated them during play situations (Dawson & Galpert, 1990). Field, Sanders and Nadel (2001) showed that imitation by an adult changed non-verbal engaging behaviour in children with ASD. They rated six items of non-verbal orienting and engaging behaviour (looking at person, positive/negative facial expressions, positive social gestures, close proximity and touching) and found significant increase throughout these items in children with ASD after they had been imitated by an adult. Escalona et al. (2001) found that children after having been imitated by an adult spent less time in gross-motor movements and showed increased frequency of physical contact behaviour (spatial closeness and touch).

Southgate & Hamilton (2008) put forward that imitation is not only a mirroring activity of putting a visual perception into movement, but does involve more complex interpersonal processes of orienting towards an action, selection of actions etc. Studies have found imitation capacities in children with ASD (Nadel et al., 2011; Robins, Dautenhahn, Dickerson, 2009) and showed that children with ASD are responsive to being imitated (Guionnet et al. 2012; Escalona, Field, Nadel & Lundy, 2002; Nadel, et al. 2011). In the developmental context imitation is seen in ASD children, even to an extreme extent. Kalish (2008) referred to this phenomenon as "echocorpia", which she described as a mechanical mimicry of movements. This behaviour usually has a repetitive quality without the

adjustments during social interaction or through affective responsiveness. Echocorpia is the embodied equivalent of what is echolalia to meaningful speech.

The imitation-based studies formed the ground for many clinical therapy programmes that aim to support development of interpersonal engagement in children with ASD and support parents in their challenging task to engage their ASD child in interpersonal exchange.

Intervention programmes like "Early Start Denver Model for Young Children with Autism" (Rogers & Dawson, 2009), "Floortime" (Greenspan, Wieder, 2009), "Geef me de 5" (de Bruijn, 2009) and the Son-Rise Program (Williams & Wishart, 2003; Houghton, Schuchard, Lewis & Thompson, 2013) strive to promote the development of social behaviour (on request) in children with ASD. They take imitation and endorsement as core items to develop interpersonal engagement towards joint attention and to promote verbal communication (Williams, Whiten & Singh, 2004; Kasari, Shire, Factor, McCracken, 2014).

2.3.6 Action understanding/sensory-motor aspects of interpersonal engagement

More recently the aspects of interpersonal relating have been described to be an embodied practice (Gallagher, 2005; 2008; Gallagher & Payne, 2014). At the level of "direct perception" (Gibson, 2002) a bodily intentionality is shared by the perceiving subject and the perceived other. In "direct perception" a proprioceptive component is matched to the perceptive component through sensitivity to bodily movements, gazes, facial expressions. In Gallagher's view intersubjectivity is a subject's notion of being in the perception of the other as he is in mine (Gallagher, 2005).

This perspective is rooted in phenomenological understanding of how human beings construct interpersonal space. Drawing upon theories of Husserl and Merleau-Ponty, De

Preester (2008) argues that social engagement and social relating are embodied mechanisms. The body is the means to perceive the other as intentional subject, because one is able to feel and see that one is able to perform the same actions as the other is able to perform (ibid.).

Social neuroscientists embedded their findings on social brain structures in a phenomenological perspective when referring to the function of a putative mirror neuron system as neuronal bridge between self and other that might be active in this process (Gallese, 2003; Gallese & Sinigaglia, 2011).

Hutto and Gallagher (2008) present primary intersubjectivity as pragmatic and body-related. They argue that primary intersubjectivity develops through direct perception without mental representations. Body-related primary interaction enables experiences of "the shared mind" that form the basis for shared narrative practices (Gallagher & Hutto, 2008) and pass towards secondary intersubjectivity later on in life.

In enactive approaches to interpersonal relating the body-to-body interaction is understood as the basis of interpersonal perception and understanding (De Jaegher & Di Paolo, 2007). In this perspective sense-making derives from responsive sensory-motor engagement with the other or with the environment. The shared 'in-between' itself becomes the source of sensations. It is in and through the shared qualities of embodied interaction that the notion of self and other develop.

Being mapped into brain structures, these experiences help the subject to experience body-related self-perception of agency (Hurley, 1998; Noë, 2004; Sauvagnat, 2005). In dance movement therapeutic practice we find that throughout attuned interpersonal movement/dyadic movements/improvised duets the perceived immediacy of shared

movement qualities between dancers (Rouhiainen, 2003; Tufnell & Crickmay, 1990) is directly reflected upon by movement impulses.

Following an enactive perspective on interpersonal relating we find that the movers contribute to the other's environment ("Umwelt") and are at the same time companions in the shared experience (Varela, Thomson & Rosch, 1991; Noë, 2007). During the movement process they learn about the other through embodied participation. Embodied intentionality and action are oriented upon the shared movement situation. This process can be understood as auto-poetic process of the living system that the dancing dyad is (De Jaegher & Di Paolo, 2007).

In autism the process of direct interaction might be hindered by the specific sensory motor organisation of the autistic child. Interpersonal experiences in early developmental phase are mainly body to body dialogues (Stern, 2010). In these interactions at the ASD child's atypical perception of human body action and movement might form an obstacle.

Panksepp (1998) suggested that early interaction might arise from a proto-self in sensory and motor domains. Rochat (2002) proposed that the relation towards the own body is of major importance for the child's developing sense of self. He (Rochat, 1998) showed that infants at three months reacted sensitive to self-produced movements of legs and suggested an early body inherent organisation. He proposed that this body scheme might be present from birth. It is shaped by multimodal experiences gained through self-observation while experiencing (self) movement. Through the self-observing activity the child develops a sense of its own body as an object to perception of the (body) self. This self-objectification might be considered a precursor of self-reflection (Rochat, 2002; Legrand, 2006). With regards to the interpersonal engagement and attunement the embodied experience of the proto-self, the child experiences its own movements as coming from the own body directing it into space

and towards the other. This process is at the base of the co-regulation between child and caregiver. From this co-regulation the child develops self-regulation in later developmental phases (Stern, 2010).

It seems that regulation in the child with ASD is not achieved by directing movements towards its environment or other persons, but rather by directing movements towards itself (Lovaas, Newsom & Hickman, 1987). Thus the child is creating a circular perception of the own body. This might help to regulate sensory overload, as has been reported by many self-advocates (Savarese, 2010a; 201b; Donnellan et al., 2013). Most vividly this is to be observed in the repetitive movements in nearby space, like rocking, fast hand movements close to the eyes etc. The repetitive stimulation of kinaesthetic senses and visual self-perception in ASD might be understood as an attempt to establish a feeling of the boundaries of its own body, and thus stabilisation of the body subject.

2.4 DMP as an intervention in autism

Rooted in dance, DMP addresses experiences of the integrated body-mind and the interpersonal kinaesthetic relationship between participants (Chaiklin, 1975). The lived body as container of life experiences relates to the environment through movement (inter-)actions. The methods applied in DMP may vary broadly. Movement activities derived from a diversity of cultural dance forms, like rhythmic circle dances in groups, dyadic improvisation or individual expressive movement processes are tailored to the specific setting and needs of a client group (Levy, 1988; Payne, 2003; Meekums, 2002).

In dance the movement activity is organised towards another person or towards a specific environment. The other is perceived kinaesthetically through kinetic qualities like rhythm, direction, spatial position, change of weight. Attunement towards the other person is achieved through these very qualities. In DMP the therapeutic relationship is achieved through movement and dance (Payne, 1992) and develops through changes in the kinetic qualities towards a shared movement quality (Samaritter, 2010).

It is through the tactile, kinaesthetic senses that the dancers know about the kinetic quality of the movement, which is thus perceived directly through the body. Proprioception is matching that which at the same time can be observed visually or acoustically. While dancing the "tactile-kinesthetic body (is) dynamically attuned to the world" (Sheets-Johnstone, 1999, p. 261). In this shared movement process no conceptual or representational systems are needed to know the other through the own movement activity. The shared movement qualities between dancers could thus be understood as body-informed intersubjectivity. A similar idea can be found in the "dialogue tonique" that de Ajuriaguerra (1973) described as early interaction pattern between child and caregiver.

DMP aims to engage participants into creative movement activities that support expressiveness and integrate interpersonal attunement and socio-cultural engagement throughout these movement activities.

DMP intervention in ASD has a twofold intention: i) to organise self-regulation through movement structures, and ii) to facilitate expressive relationship with the environment (co-mover) (Erfer, 1995).

DMP interventions in ASD actively address body informed interpersonal exchange. Common practice in DMP with children and adolescents with ASD are mirroring

interventions (Wengrower, 2009; Tortora, 2010; Devereaux, 2012; Martin, 2014). In dyadic DMP the therapist actively attunes to the movements of the client by adjusting her movement patterns to the directional, weight or rhythmic components of the movement patterns of the child (Bartenieff & Lewis, 2002). This attunement goes much further than only rhythmic synchronisation or spatial orientation towards the other as it includes all modes of attunement and engagement simultaneously. In dyadic DMP the therapist joins the child's kinetic quality and engages in the social orienting movements of the child and thus creates shared movement qualities (Samaritter & Payne, 2013). The child then can get a visual or acoustic perceptual input on her/his own movement patterns whilst at the same time experiencing his/her own movements through the kinaesthetic senses. Through the highly attuned movement responses from the therapist the autistic child is offered a perception-action-connection to his own movement patterns. This non-verbal relating in kinetic qualities offers a connection to preverbal structures of interpersonal relating; this type of interaction has been conceptualised as kinaesthetic intersubjectivity (ibid.).

Dyadic DMP relates to the theoretical approaches on early interpersonal interaction in that it connects to the earliest developmental patterns of relating in order to meet the child at its developmental stage (Kestenberg, 1975). In DMP the autistic traits of sensorimotor organisation are not taken as deficits or disturbances. Instead, they are considered to be the child's *specific personal* sensory-motor patterns. The therapist treats these patterns as the child's personal dance and connects to these (kin) aesthetic material (Partelli, 1995) as s/he would do to every other dance partner's movement vocabulary. As the DMP therapist is trained in movement observation s/he is able to offer a highly adjusted and attuned kinaesthetic context for the child's actions. In individual case studies the effect of DMP intervention has been described in terms of an increase in the child's relating behaviour towards the therapist (Adler, 1968a, Loman, 1995).

Although DMP is a common intervention in autism ever since the rise of DMP (Chaiklin, 1975; Adler, 2003) there are hardly any empirical data available on outcomes and effectiveness. However, DMP has been regarded as an intervention into ASD in diverse settings (clinical therapy, schools for special needs, individual coaching) and many DMP's have written about their clinical experiences with children with ASD (Adler, 1968a; Siegel, 1973; Kalish, 1976; Erfer, 1995, Loman, 1995, Partelli, 2005; Torrance, 2003; Tortora, 2006; Scharoun, Reinders, Bryden & Fletcher, 2014). The bibliography service of the American Dance Therapy Association e.g. (ADTA, 2006) offers a long list of unpublished case studies. Therapists report that the child shows more sensory-motor organisation and a reduction of fragmented perceptions and movement during movement activities. Also an increase of movements initiated by the child towards the therapist or caregiver is reported (e.g. Erfer, 1995; Loman, 1995; Loman & Foley, 2003). However, these outcomes have not yet been studied systematically, which is the intention of this study.

The discovery of MNS brain circuits engaged DMP's into more theoretical considerations on the impact of mirroring interventions on imitation and empathy (Winter, 2008; McGarry & Russo, 2011; Behrends et al., 2012; Gowen 2012; Amos, 2013). The outcomes of DMP interventions as described in clinical case studies show a strong resemblance with the effects of imitation on the social engaging behaviour in ASD as described by e.g. Field et al. (2001), Escalona et al. (2002), Robins, Dickerson & Dautenhahn (2005).

Studies on DMP group intervention with children and adolescents have shown some effect on autistic traits. Hartshorn, Olds, Field, Delage, Dullen & Escalona (2001) conducted a study with 38 children with ASD in a school setting. Movement therapy was offered to the intervention group twice a week for a period of two months. Children who participated in the movement therapy showed post intervention less time wandering, less time negatively responding to teacher and more time on-task behaviour. Koch and colleagues (Koch, Mehl,

Sobanski, Sieber & Fuchs, 2014) conducted a controlled study with 16 adolescents with ASD who were offered a manualised group DMP treatment with dyadic and group mirroring activities. After seven weekly sessions participants of the intervention group reported through self-report scales improvements in well-being, body awareness, self-other distinction, and social skills.

2.5 Movement analysis in DMP with ASD

Children with ASD show atypical features of sensory-motor and motor development from early age onward throughout development (Teitelbaum, Teitelbaum, Nye, Fryman & Maurer, 1998; Rinehart, Bellgrove, Tonge, Brereton, Howells-Rankin & Bradshaw, 2006; Fournier, Hass, Naik, Lodha & Cauragh, 2010; Bhat, Landa & Galloway, 2011).

In the clinical context of DMP with children and adolescents, sensory-motor development and motor maturation are taken into account. For the functional analysis of movement development test materials like Southern California Sensory Integration Test (Ayres, 1989), Marburger Körperkoordinationstest, Entwicklungsraster Psychomotorik (Hammink, 2003) and for the Netherlands the PsyMot (Emck, Hammink & Bosscher, 2007) are in use.

However, for the DMP context the therapist is principally interested in the specific movement repertoire of a child – regardless of the question whether the movement development shows typical or atypical traits. With Laban based movement analysis (LMA) (Bartenieff & Lewis, 2002) dance therapists have a tool to observe, describe and notate movement behaviour. LMA enables the therapist to analyse the child's personal movement profile, regardless of developmental issues at hand. The analysis of movement patterns

enables the therapist to attune as closely as possible to the child's movement behaviour and meet the child at its own level of (sensory) motor development. In the DMP literature there are many examples of case studies with children with ASD where the therapist did not focus on developmental delays as such, but took the movement actions of the participating child as a point of departure to develop a non-verbal relationship through movement (Adler, 1968a; Loman, 1995; Erfer, 1995; Partelli, 1995; Tortora, 2010).

Although every child has specific characteristics of its own, DMP therapists have described similarities in movement patterns throughout the autistic spectrum. Kalish (1976) developed a diagnostic inventory for children with early developmental disturbances based on movement observations. The Behavior Rating Instrument for Autistic and other Atypical Children (BRIAC) evaluates the child's development in the several domains, among them body movement as a separate scale (Wenar, Ruttenberg, Kalish-Weiss & Wolf, 1986). Kalish initially described the body behaviour as either heavy or on the contrary very rigid with a progression towards normal repertoire of body movement behaviour.

Sossin & Loman (1992) described movement qualities that are characteristic for the movement profile of individuals with ASD. They described a tendency to use neutral shape-flow, which gives the impression of lack of (kinaesthetic) animation. They observed a strong tendency to move with highly localised tension-flow, which might result in lack of continuity of movement and in apparently unrelated adjustments of movements or clashes during movement adjustments. Partial stabilisation seemed to be largely undeveloped. In shape flow categories individuals with ASD seemed to prefer shrinking patterns. Shaping in spatial planes, like organising one's own posture around that of a partner, is usually less present or not found in those with ASD (Sossin & Loman, 1992; Loman & Merman, 1996).

Movement analysis provides the opportunity to look at structures of interpersonal responsiveness that precede semantic and conceptual structures of relating that would be more bound to capacities of social cognition as central coherence perception and theory of mind.

Attunement is a complex phenomenon that is composed from a basic attention towards the other person, a felt engagement with the other and shared attention as for example seen during joint actions. The movement characteristics of individuals with ASD seem to interfere with the responsive attunement towards a shared action, which makes it difficult for a neuro-typical person to develop a sense of relatedness with the ASD child.

Summarising we find that a DMP movement profile in itself does not inform about the social interaction. The role of reciprocal embodied interaction for the development of interpersonal engagement and attunement is described by many researchers. In order to investigate changes in social attunement through movement changes there has to be a relational quality to the movement. Although the KMP covers interpersonal behaviours in tension flow and shape flow patterns shared by two movers, this instrument might not suit our purpose as children with ASD have shown atypical movement profiles in the domains of shape flow and tension flow. From the literature no observational instrument was found that would cover the changes in the interpersonal relating of children with ASD that parents, caregivers and therapists reported after DMP intervention. Of specific interest for further implementation of DMP interventions would be the question whether these changes can be identified in movement actions that occur during social/interpersonal engagement and interpersonal attunement. These changes take place within the child's personal movement capacities and can thus be investigated within the individual subject's development or within the group's development of social engagement and attunement.

2.6 Summary and further research questions

The reviewed research literature on intervention into interpersonal attunement and engagement in children with ASD has brought about a broad range of behavioural studies as well as studies in cognitive neuroscience and developmental psychology. It was found that models on disturbances and disabilities have dominated the discussion on ASD. Models on disrupted social cognition have served as a base for clinical interventions aiming to foster "normal" social engagement in children with ASD.

Behavioural studies seem to focus mainly on the child's ability to imitate the other as this is regarded to be a precursor for empathy and attunement. Cognitive neuroscience studies lean heavily on simulation theory without considering the perspective of the child being addressed by the other. Simulation theorists consider the MNS as a central brain function in processes of interpersonal attunement. The studies showing atypical action observation chaining in children with ASD used static visual materials during the fMRI tasks (photographs of face positions) - or isolated hand movements (Guionnet et al., 2012). The static and/or fragmented character of these features may not capture the kinetic dynamics of embodied person-to-person attunement.

Many studies and interventions have given a strong accent to the ASD child's capacity to imitate, whereas only a few (behavioural) studies have focused on the effects on social engagement when the other is imitating the child. No study was identified which investigated whether the self-other engagement in autism might be brought about not by imitation but other, pre-verbal mechanisms. Shifts of attention to developmentally earlier forms of attunement might offer more specific information on the kinaesthetic structures of interpersonal relating that are at stake in DMP.

Few studies suggest that the MNS activation is modulated through sensory motor experiences. The social brain structures are considered to be developing and learning circuits/systems that develop through embodied experiences. Focal movement intervention into early interpersonal attunement patterns might then be considered to have an impact on the social brain structures.

In the studies to date, which investigated the possibilities of the child with ASD attuning to a partner during social interaction, much attention has been given to the role of imitation and deficient MNS activity. The imitative activities of the child in the early dyad have been analysed according to semantic and social cognition models, whereas the underlying kinetic pre-conceptual structures have hardly been taken into account. More recently more attention is given to the role of motor activities for the quality of dyadic relating (De Jaegher, 2013; Trevarthen & Delafield-Butt, 2013; Amos, 2013) propose a more experiential view on interpersonal attunement and engagement. This perspective seems to fit in well with that of the current study.

DMP as a dyadic intervention seems to offer the possibility to contact the ASD child within their self-regulatory movement patterns through embodied, non-verbal relating. The challenges for caregivers and therapists would lie then in joining the child's regulating movements in order to bring about a sense of shared regulation. It is anticipated from the literature that the ASD child's development of (self-/other-) regulation can be supported by/through the experience of attuned embodied actions and movements by caregivers. No explanatory model has been found for the outcomes of DMP intervention in ASD as described in the clinical context.

A shift of perspective, from pathology issues in ASD population, towards a more developmental approach may offer new insights on interpersonal relating in ASD. A

perspective that considers ASD's specific ways of relational learning and takes into account the developmental flexibility of neuronal connectivity and plasticity might lead to new options in support and increase of interpersonal relating in ASD.

The model of direct interaction (Gallagher, 2008) as well as the enactive approach to interpersonal relating (De Jaegher, 2013) offer theoretical structures that may contribute to a theoretical frame of reference for a body and movement oriented approach to interpersonal attunement and engagement.

Processes that have been described from DMP practice can be related to concepts of an enactive perspective on shared sense-making (Fishman, 2009). They might serve as a frame of reference for the further study of underlying mechanisms of social relating in children with ASD as they occur in the context of DMP.

DMP appears to have the methodological means to intervene in non-conceptual interpersonal relating between two movers. This combines well with a non-pathologizing developmental perspective on ASD specific features in interpersonal relating. With a prominent role for mirroring interventions DMP has the experiential means on how to address underlying mechanisms of social relating in children with autism. More specifically, the interventions that have been described in case studies on DMP in combination with autism, agree in their use of attuned movement interventions, which appear to develop embodied and kinaesthetic ways of interpersonal engagement in autism. The DMP intervention of mirroring seeks to engage the participant in a mutual kinaesthetic experience, in which sensory-motor activities are shared experiences between partners, who move in non-conceptual structures of space, time and weight. The outcomes of clinical intervention are promising, but there is a need for more systematic research into the field.

One of the limitations of case study reports is that they do not refer to one meta-theoretical conceptualisation of DMP, but that they represent a multitude of choices regarding therapy theory. Also they are not always explicit in their theoretical frame of reference. Also the underlying assumptions regarding the movement specific contribution of DMP intervention to the atypical features of an ASD population are not always illuminated. Many therapists refer to psychological theories, in particular with the developmental perspective of Stern (1985) and the dyadic developmental perspective of Winnicott (1971) as mainstream references. Also the delineation of DMP specific methods for intervention in ASD could contribute to replication across therapists and to specific methodological modules in the training of DMP's. Furthermore could the identification of signposts for interpersonal orienting and engagement behaviours help to monitor non-verbal relating behaviours throughout DMP therapies.

Further research is required to

- identify the specific features of dyadic DMP intervention which are relevant to children with ASD and
- identify movement markers that may be attributed to interpersonal attunement and engagement that can be observed during DMP intervention with participants with ASD
- identify whether these movement markers could contribute to monitor outcome evaluation of clinical DMP with children with ASD.

The clinical context of a DMP intervention is likely to offer a suitable frame for an exploratory, practice-based research of the formulated research features.

Observations throughout a therapy process might identify changes in the interpersonal attunement behaviour between therapist and the ASD participant.

Within this context the guiding research questions for the current research may be formulated as follows:

i) Can analysis of changes in interpersonal attunement behaviour in children and adolescents with ASD, as observed during a DMP contribute to identify specific movement behaviours that occur during interpersonal relating between the ASD participant and the therapist?
ii) Can analysis of changes in interpersonal attunement behaviour between DMP therapist and the ASD child, as observed during a DMP intervention, contribute to identification and conceptualisation of clinical interventions that aim to support interpersonal attunement in ASD?

The study of these phenomena might bring about a movement informed understanding of social relating in ASD. Furthermore, it may open new perspectives on clinical interventions to support interpersonal attunement in ASD.

Chapter 3

Stepping stones: Research methodology

"Like the dancer who finds her centre from the base of the spine and the connections between the spine and the body, the qualitative researcher is centred by a series of design decisions"
(Janesick, 2000, p. 211)

3.1 Introduction

This chapter will describe the methodological considerations and choices that were made to assess the research questions. Closer analysis of the questions led to the design of a series of studies that investigated each a specific aspect of the research path. In this chapter the overall methodology will be presented. The four studies that together composed the current research project as a whole were quite different in their structure and research methods. Therefore the specific details for every study, as well as detailed information on methods will be presented in the separate chapters on each study. This construction also follows the actual path of this research, as each study evolved from the preceding.

3.2 Conceptual frame of reference

The aim of the DMP intervention is to bring about non-verbal engagement of the child towards the therapist, at the core or which a reciprocal engagement appears as co-creation of shared or joined movement actions (Payne, 1992; Samaritter, 2010).

The intellectual challenge for this research was how to relate a phenomenon that had been observed in the natural setting of DMP, which was basically both nonverbal and pre-conceptual in its experiential qualities, to theoretical concepts that are both adequate (Schütz, 1967) and providing connections with established bodies of developmental and social theory.

Traditional academic research is usually framed through verbal structures. One might question whether verbal instruments like questionnaires would be the most appropriate for grasping the experiential and action driven processes that are at stake in a dance therapeutic setting.

The aim here was to pair the natural situation (clinical experiences) with the systematic observation (research data-collection). Closeness between the clinical origin of the research domains and the actual research path would serve a twofold aim, it would inform the research content from the experiential content of the situated therapy practice and it would support feasibility of the research findings in terms of clinical applicability (Kazdin & Weisz, 1998).

This required a methodology that was still close to the clinical content and that allowed assessing what was happening in the dance-therapeutic dyad that establishes interpersonal engagement and attunement. Considering the participating ASD child, it should illuminate which movement behaviours contribute to the interpersonal relating. Considering the

therapist it should clarify which intervention behaviours contribute to an increase of interpersonal relating behaviours in the participating child.

The research path was outlined to identify the elements that indicate changes in interpersonal attunement and engagement behaviour in children with ASD within the natural situatedness of the therapy. Close observation of cases that had shown a positive outcome on interpersonal relating behaviours were expected to deliver information about measurable categories for the interpersonal relating behaviour.

Research strategies from phenomenological psychology (Groenewald, 2004) as well as applied sciences (Smeijsters, 2005; Smeijsters, Beurskens, Reverda, Gielen & Penzes, 2012) offer fruitful concepts and structures for observation of experiential data. Both are known for their strong orientation on processes of change, which also is the purpose of this study. They may offer procedures to measure progression and outcome of intervention with qualitative methods (Kazdin, 2008).

The research methodology thus needed to cover two questions:

i) how to systematically measure the up to now intuitive outcome of the clinical intervention?

ii) how to replicate the up to now intuitive outcome of the clinical intervention?

As our target areas were situated in the domain of experiential knowledge and presentational knowledge (Heron, 1992) – an action observation research approach (Ritchie, Lewis, McNaughton Nicholls, Ormston, 2014) would be appropriate to investigate the questions at hand. A grounded theory approach (Glaser & Strauss, 1967) was expected to facilitate the assessment of the therapist's perceptions and experiences within the interpersonal phenomena. The participants' personal perception however, was more complicated to

capture, as due to the ASD features they initially were not able to communicate to others about inner states of relatedness in a self-reflective autobiographical medium. So another challenge for this project was to find markers of interpersonal experiences (of the child) that would allow the researcher to "read" the child's intentions with regard to non-verbal attunement without yet constructing meaning from these behaviours (Denzin & Lincoln, 1994; Merriam, 1997). Several studies in the domain of interpersonal relating in children with ASD have used movement markers as indicators of social behaviour (Ingersoll, Lewis & Kroman, 2007; Field et al., 2001; Robins et al., 2009). Suchlike markers were considered to prove useful in the observation of interpersonal behaviour of the ASD participant. Furthermore, they may form a fruitful intermediary between the pre-conceptual phenomena at hand in the DMP setting and the theoretical narrative about these very phenomena.

In order to evaluate treatment outcome across several cases it would be necessary to replicate a same type of intervention for each of the single cases. Replication across cases has also been suggested as a criterion for the evaluation of treatment procedures (Chambless and Hollo, 1998). For replication of DMP outcome to be achieved across cases, the up to now intuitive clinical intervention had to be described and defined. As the domain of interest for this research are the relational behaviours between the child and the other, the actions of the therapist in the natural therapy setting may serve as the material for the assessment of the actual intervention. Clinical vignettes could show, which specific actions of the DMP therapist contribute to interpersonal relating with the ASD participant. Analysis should then identify common themes and structures across cases (Hartley, 2004). It was expected that this would deliver the means for the clinical intervention to be described and specified in a way that it could be replicated across individual cases.

A direct replication of the intervention across cases could show through the similar outcome within a group of single cases with regard to the behaviour of interest, which for this

research would be the changes within the interpersonal relating behaviours in participants with ASD (Hilliard, 1993).

The relevance of the obtained observable markers for the targeted content could be validated in terms of recognition by external observers (Cruz & Koch, 2004). If the construction of the observables would deliver agreement between raters on the behaviours observed, then the obtained observable markers could be tested in a succeeding procedure for their content in (cor-) relation with the content of other, standardised measurement instruments (Cruz & Feder, 2013). If interaction with standardised outcome measures was to be found, the observable markers may serve in building evaluation tools for the changes in interpersonal relating behaviours of participants with ASD during DMP.

Summarising from these conceptual considerations, the questions, which arose from the reviewed literature, were reformulated as stepping-stones for the research path that should:

- evaluate markers for interpersonal attunement and engagement in dance and movement activities
- evaluate dyadic DMP intervention in ASD: define the interventions and the session structures that have been applied
- evaluate, if (found) movement markers for interpersonal attunement and engagement in DMP constitute reasonable interrater agreement
- evaluate whether these movement markers are suitable to assess therapy outcome of DMP with individuals with ASD

Through these research actions the envisaged project might contribute in a twofold way to the knowledge in the domain of DMP. Practically, in the specification of applicable therapeutic interventions, which are clinically relevant in that they can be shown to effectively increase ASD participants' interpersonal relating behaviours. The narrative/vocabulary of this specification may contribute to theory formation on

therapeutically effective DMP interventions. Theoretically, the project may contribute in the specification of social attunement in terms of interpersonal movement dynamics. The vocabulary of this specification may contribute to building outcome-monitoring tools that reflect experiential behavioural markers.

3.3 From clinical observations towards systematic movement analysis in single case studies

Research that is looking for the relevant information from the clinical context, i.e. that of DMP with ASD participants, has to account for the natural therapy setting. The situated conduct that has been the focus of interest for this study is best investigated by means of a case study design. In addition it has to look for explorative methods that allow distilling the relevant information with an open mindset, i.e. without predefined lenses. Case studies have been considered "useful for the development and evaluation of novel assessment and treatment techniques" (Nock, Michel & Photos, 2007, p. 39). An explorative, observational approach with mixed (qualitative) methods would enable us to observe individual cases and look for the specific behaviours of interest within the interpersonal relating. The practice-based situatedness of this research may be better equipped to generate applicable instruments for the DMP practitioner, as academic laboratory research often lacks transferability to clinical interventions (Kazdin, 2008).

The research questions that were investigated for this project had not been studied systematically before. According to Yin (2003) valid multiple single case designs should show replication of process and time related data in a series of single cases. Replication of treatment outcome could serve an explanatory purpose on effects of the intervention

applied. Single case designs have been considered appropriate for piloting investigations into the effects of mental health interventions (Kazdin, 1993). The Cochrane guidelines on validation of evidence-based interventions in mental health care also describe a multiple replicated case study as a valid method to show evidence (Armstrong et al., 2007).

The strength of a case study design is that it allows the study of an intervention in the natural environment of therapy and thus stays connected to practical issues at hand and ensures that the developed methods and processes are applicable in practice. Also the intervention and outcomes can be studied within the context in which they occur (Yin, 2003).

For this project we faced a relatively low incidence of the ASD's, partly due to the clinical setting and partly due to recent organisational changes in the Dutch mental health institution where this research was situated. Accordingly only a small sample of ASD participants could be included for participation in this project. However, in view of the multiple and independent measurements available it was expected to find trends in the various domains of interest.

As in single cases studies data collection is bound to a relatively small source, it is crucial to strengthen the results by analysing the obtained data from multiple perspectives (Yin, 2003; Barlow, Hayes & Nelson, 1984). For the present study data generated from movement analysis pre-post intervention have been contrasted with data from repeated movement analysis over the continuous therapy process. In the course of the project convergent indications of improvement after the DMP interventions were pursued. Convergence between instruments, if found, would contribute to some more empirically based confidence in the effectiveness of the interventions and assessments administered. In the last study convergent measurement was achieved through contrasting pre-post intervention movement

analysis with pre and post intervention questionnaires that may or may not confirm found therapeutic effects

The indicated themes for this project have been explored in four steps. All four were rooted in single cases of DMP intervention with ASD participants. The study materials were generated from video-footage from clinical sessions of dyadic DMP. Thus all four steps share characteristics of case studies, situated in the clinical context in which they usually are applied.

The succession of these four studies evolved one from the other. There has been a natural flow from finding content to testing content, from finding structures to applying and testing structures. Underlying this process evolved a structure of validity testing for the obtained content and assessment structures. This had not been the original focus of the project, but it became apparent throughout the research path, which accordingly conveyed an emergent perspective on validity construction. "Laying down a path in walking" (Varela, 1987) the researcher sought to keep openness in order to be guided by the structures that emerged from the case-materials.

The global organisation of the projects was as follows. In the first step (Study 1) an observational, retrospective approach was used to assess movement markers of interpersonal attunement and engagement of the ASD participant during DMP. The study looked for indications of change in the interpersonal attunement and engagement behaviours as they occurred in the course of DMP treatment.

In the second step (Study 2) an observational, explorative approach was used to assess the interventions of the DMP therapist that were involved in interpersonal attunement and

engagement behaviours throughout the course of dyadic DMP with children and adolescents with ASD.

In the third step (Study 3) the movement markers that had been obtained during the first study were evaluated through movement analyses for interrater agreement between multiple movement raters. Coding procedures were tested for their usefulness to produce interrater agreement.

In the last step (Study 4) the aim was to replicate earlier results of the DMP approach that had been specified as a result of the second study. In this study a structured approach to the natural setting was applied with a convergent measurement setup.

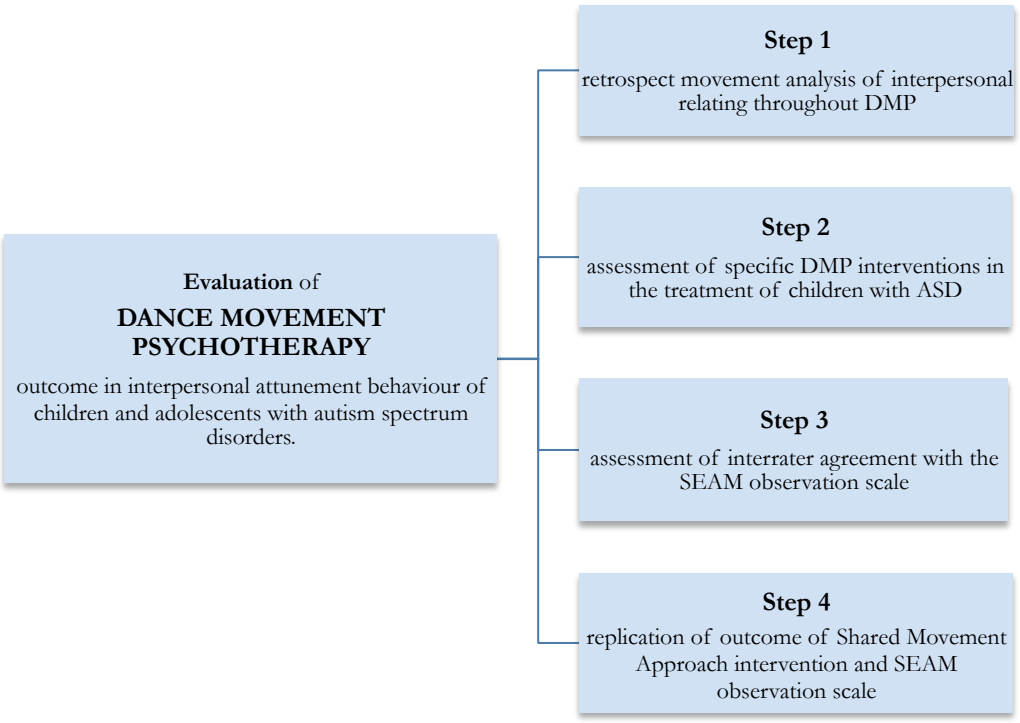


Table 1: Overview of the studies that together make up the project "Inside the Mirror"

3.4 Stepping stones: The design of the sub-projects in overview

In the following, the methods and data collection procedures for each study separately will be presented in more detail. The assessment tools, data-analysis and ethical considerations will be discussed for the four studies together in sections 3.5 to 3.7.

3.4.1 Stepping stone 1: Retrospect content analysis of interpersonal relating behaviours

The aim of step one was to assess changes of interpersonal attunement and engagement behaviour in participants with ASD in terms of observable movement behaviour as it occurred in the course of DMP.

Methodology:

For this study a mixed methods approach was applied that used qualitative and quantitative measures. The successive steps that were taken throughout the process followed a grounded theory approach Glaser & Strauss (1967). In a first qualitative data collection an explorative observation with an open coding procedure revealed movement markers that appeared during interpersonal relating as initiated by the child. In a series of actions these obtained observations were summarised and structured (Mayring, 2000). The obtained movement examples were arranged into distinctive thematic groups. Within the thematic groups then summative categories of movement markers were distinguished according to their contents. These categories were defined by brief descriptions. After this the movement markers were re-examined and their definitions were revised. Movement examples were added for each category.

The movement observation was qualitative in that movement markers were identified that were indicated as Social Engagement and Attunement Movement (SEAM) behaviours. The listed movement markers delivered a preliminary assessment tool for quantitative coding of interpersonal attunement and engagement behaviours for the context of DMP. The coding procedure had yet to be defined, but was explored with sequential as well as summative coding structures (Knoblauch, Schnettler & Raab, 2009).

The SEAM observation scale allowed selective coding of SEAM behaviours with a quantitative outcome measure. Selective coding with the SEAM observation scale was tested for sequential as well as for summative annotation procedures within specified time frames. In these observations frequency as well as duration of appearance of SEAM markers could be specified.

Procedures:

Observational data were collected from annotation and analysis of video vignettes of dyadic DMP in a clinical setting with young participants with ASD. From already available video materials four cases were selected for their similarity in duration of therapy and available video vignettes across sessions throughout the treatment process. Vignettes for each case were taken from comparable moments in the therapy-process, at starting stage, at treatment point 1 at about one third of the therapy process, at treatment point 2 at about two third of the therapy process and then during the end stage of treatment.

All the video-material was scanned and annotated by the researcher. In view of her experience as a therapist, she selected scenes wherein she recognised an action of social orienting, attuning or engagement towards the shared movement activities initiated by the participant. The structural analysis of the obtained observational data delivered the SEAM observation scale. This scale was then applied in the observation of the same video-material.

This yielded quantitative outcome data of a number of SEAM behaviours during a set time frame. From the quantitative outcome of the SEAM observation for the selected time-points throughout the therapy it was now possible to compare these time-points in terms of the number and type of actions occuring within one SEAM category and in terms of the configuration or profile of SEAM categories involved during an interpersonal movement action initiated by the child.

3.4.2 Stepping stone 2: Retrospective content analysis of DMP intervention

The aim of step 2 was to assess specific aspects of dyadic DMP with juvenile participants with ASD as expressed in the actions of the therapist.

Methodology:

A mixed methods approach was used. Video-material from clinical dyadic DMP was scanned and annotated to inventory the different intervention types the therapist used in the course of the therapy process. A grounded theory approach was used to describe and embed clinical DMP interventions into DMP theory. First, the movement behaviours of the therapist were scanned with an open coding procedure in view of their function within the interpersonal relating with the ASD participant. The collected observations were then grouped around distinctive themes and structures. The observational data were related to themes and structures analysed from the therapist's journal and session notes and to themes and structures found in DMP and dance related literature. Finally a conceptual framework for a DMP intervention towards interpersonal relating with ASD participants was formulated.

Procedures:

Data were collected from annotation and analysis of video vignettes of clinical DMP with young participants with ASD. From already available video footage four cases were selected.

For each single case vignettes were taken from comparable moments in therapy-process, i.e. at starting stage, at one third of the therapy process, at two third of the therapy process and in the end stage of treatment. The observed interventions and actions of the therapist to address dyadic relating with the ASD participant were compared with the therapist's journal notes on interactional actions during dyadic movement improvisation. This procedure was applied to clarify movement markers that carried an intention towards relating with a partner in the context of a shared movement situation.

3.4.3 Stepping stone 3: Assessment of interrater agreement on the use of the SEAM observation scale

The aim of step three was to assess whether the obtained movement markers were suitable to produce interrater agreement between multiple raters.

Methodology:

For this study a mixed methods approach was used. In multiple annotation procedures the quality of raters' individual experiences with the inventory were assessed through verbal evaluation as well as raters' journal notes. Interrater agreement on the use of the SEAM observation scale was tested for two rating procedures. Interrater agreement was evaluated and calculated through Cohen's Kappa (Cohen, 1960).

Procedures:

Qualitative data were collected from journal notes and questionnaires on the raters' experiences with the SEAM observation scale. Quantitative data were collected from multiple annotation procedures of video vignettes from clinical DMP with young participants with ASD. Two rating procedures were tested for the observation with the SEAM scale, the EUDICO Linguistic Annotator (ELAN) that allowed to annotated onset

and offset of specific behaviour, and a listed scale with SEAM markers that used a summative procedure for presence or absence of a specific behaviour during a set period of time.

3.4.4 Stepping stone 4: prospective pilot study on the replication of the DMP intervention and on outcome evaluation with the SEAM observation scale

The aim of the fourth step was to replicate the clinical outcomes of dyadic DMP intervention in a clinical setting in a series of individual cases and to compare the outcomes of movement analysis with the SEAM observation scale with the outcome of standardised questionnaires on social behaviour.

Hypothesis for this study:
An increased use of SEAM behaviours in participants is inversely related to a decrease of their social problems

Methodology:
This study was conducted in a Dutch mental health care centre, as the natural setting of clinical outpatient therapy. The therapy model was tailored from the outcome of study two and conducted as a Shared Movement Approach (SMA) intervention. The duration was limited to twelve sessions SMA. A pre-post intervention design was used to inventory the effects of the SMA intervention in four single cases N=1. Within subject effects as well as group average effects were evaluated. Pre-post intervention outcome was triangulated with effects of sequential data taken throughout therapy process at four measurement points. The outcome of observations with the SEAM scale was compared to outcomes of standardised measurement tools. If correspondences were found between SEAM outcomes and

standardised measurement outcomes, this would be in support of the construct validity of the SEAM observation scale.

Procedures:

For the fourth study data were collected pre and post therapy and continuous data were taken from set measurement points throughout therapy. Pre-post therapy for each single case a movement profile was produced with the SEAM observation scale that was taken from video vignettes. In addition, for each single case a profile of social behaviours outside the therapy context was evaluated by means of several instruments: two parental questionnaires on social behaviour, the Child Behaviour Check List (Achenbach et al., 2008) and the Social Responsiveness Scale (Roeyers Thys, Druart, de Schryver & Schittekatte, 2011), as well as one self-report scale on social behaviour, the Youth Self Report (Achenbach et al., 2008). Continuous data were gathered with the SEAM observation scale from annotations taken from video vignettes at several pre-defined measurement points throughout the therapy process.

3.5 Participants

Throughout the research movement analysis was taken from video-vignettes of DMP with young participants with ASD. All video recordings were produced with a fixed camera set up by the researcher before the therapy sessions. The therapies were conducted in the outpatient setting of a Dutch mental health care institution. The researcher was acting as the therapist in all clinical activities.

For research steps 1 and 2 video-samples were taken from available material of four clinical cases of DMP with participants diagnosed with ASD. The participants in these therapies were two male, two female, age 6.3, 12.5, 12.1, 17.2 years respectively. Participants were diagnosed with ASD according the criteria of the DSM IV by child-psychiatric diagnostics in Dutch mental health care institutes. A mental health care worker, usually a psychologist, had referred them to DMP. The therapy had been conducted in accordance to the regular treatment programme paths of the department. For the video materials that have been used in the retrospective studies caregivers and participants had been asked after termination of the therapy for their consent to use the available video materials for a retrospective analysis of the therapy process.

Participants in research step 3 were the therapist-researcher and five experienced and certified movement analysts and one psychologist who had followed an extensive training in movement analysis during her training. Analysts were recruited through DMP's professional networks in the Netherlands. All movement analysts had already followed specific training in Laban based movement analysis as part of their training in DMP or in psychology. Video vignettes used in this research step were taken from the same therapies from which video-samples of clinical DMP dyadic sessions had been selected in research step 4.

The participants for the prospective pilot study in research step 4 were recruited over a period of one year after regular referrals for DMP at ORBIS GGZ. Young adolescents with ASD, who were referred to DMP, either after the intake procedure or while having been in care for some time, were invited to take part in the study. All participants were relatively high functioning (IQ > 80) and had been classified with a diagnosis on the autistic spectrum according to the Diagnostic Statistic Manual (DSM) version IV-TR by child psychiatric diagnostic procedures. Adolescents were referred for DMP therapy within the regular treatment programme paths of the department. The project was presented to twelve

adolescents, from which four decided to participate. These four followed the procedure all the way through. Mean age of the participants at start therapy was 14,9 (lower: 11,9, upper: 17,1); three were male and one female.

3.6 Ethical considerations

For this project medical ethical approval was sought from the Ethics Committee of the University of Hertfordshire (ECDA) and in addition from the independent Dutch National Medical Ethical Committee (METC). The protocol was accepted by the ECDA and registered under number LMS/PGR/UH/02015. The protocol was accepted by the METC and registered under number 13-N-75 (Appendix 1). The protocol was accepted and registered at the site ORBIS-GGZ by the mental health care institution's ethical commission and the Board of Directors and registered under project number 13.034 (Appendices 2 & 3). An intersubjective approach was sought throughout all studies with all participants. Their commitments and their opinions were welcomed with maximal openness. Informed consent has been sought from all participants. Parents and children were informed about the nature of the research and the procedures involved by means of a written information sheet (Appendix 4) and by oral presentation during a first information meeting (Appendix 5). Informed consent was given by parents and participating adolescents (Appendices 4, 5, 6).

The researcher conducted all therapy activities for this study. As a therapist she is bound to the Dutch ethical code of the DMP practitioners and to medical ethical code that applies for Dutch mental health care institutions.

For the retrospective study written consent for the use of the video footage for observational research was given by caretakers and, according to the Dutch mental health care guidelines,

also from the juvenile clients in case they were older than 12 years (Appendix 6). Participants and parents had been informed that they could withdraw their consent at any time during the research without negative consequences for their process at the treatment centre.

During the debriefing (Appendices 9 & 10) with the participants of the prospective pilot study participants and parents could give additional consent for publication of photo and video material within the thesis and presentations of the research findings. In all cases all video materials were treated as part of the patient file and were safely stored.

All materials were treated confidentially according to the Dutch guidelines for the handling of patient data. Throughout the research all data were anonymised before analysis. Participants' anonymity has been warranted throughout all research activities.

Participating movement analysts were informed about the research through the written research plan that had been part of the institutional ethic procedure at ORBIS Mental Health Care Centre and by oral presentation. Movement analysts signed for informed consent on the use of their analyses for the research project (Appendix 7). All analysts signed a privacy statement (Appendix 8), in which they consented to handle all video-materials according to the Dutch mental health care policy regarding privacy.

The wellbeing of all participants was in focus throughout all therapy and research activities. For the clinical context the case manager in charge consulted participants about their experiences throughout therapy. Parents were consulted about the child's responses to the therapy setting. All participants were informed and confirmed that the trials would stop in case of any sign of distress. They were assured that withdrawal from the research project would not have any negative consequences for the further therapy process.

3.7 Assessment tools

Video:

Throughout all studies video-vignettes were used for the observation tasks. All DMP sessions were videotaped with a digital camera. The camera was placed on a fixed spot throughout all therapy sessions. For the open coding procedures the recordings of whole sessions were used for analysis. Vignettes with duration of 45 seconds were used for the interrater study. These vignettes were generated and edited with digital editing programs iMovie and Final Cut. All video-vignettes were presented to the movement raters fully anonymised and in a random sequence. The randomisation of files for study 3 was performed by means of a software program[3]. The twenty-four vignettes were randomly distributed across raters.

Movement observation tool:

All open coding movement observations were conducted by the researcher with Laban based Movement Analysis (LMA). With this observational method the participant's kinetic patterns, the use of body and the use of space could be assessed. The observations were focussed on analysis of social orienting, attuning and engaging movements. All observations were taken from video-vignettes of clinical DMP sessions. The specific interest was on movements that participants spontaneously used to attune to the movement partner and in movement impulses that the participants spontaneously directed towards the therapist. These movements were taken as an indicator for the participant's notion and awareness of the therapist as a partner in the context of the shared movement activity. The changes in movement behaviour of the participant towards the therapist were expressed in terms of interpersonal movement markers. These interpersonal movement markers were compared to markers used in studies on imitation of non-verbal behaviour in children with ASD and were piloted in a small clinical study on the effects of DMP intervention on social engagement in

[3] Randomization tool used for this study accessed April and June 2014 through: http://www.randomization.com

children with ASD (Schoonewille, 2011). The term "Social Engagement and Attunement Movement" (SEAM) was introduced to indicate spontaneous movement behaviours that were addressed or directed towards a partner.

Movement observation tool/ ELAN:

The notation of the movement observations was performed with two annotation procedures.

In study 3 the short video-vignettes of forty-five seconds were annotated with the ELAN annotation tool, version 4.6.2 (Wittenburg, Brugman, Russel, Klassmann & Sloetjes, 2006). This program has been developed at the Max Planck Institute for Psycholingustics in Nijmegen, the Netherlands and is freely available from the institute's website[4]. The tool enables the import of a video file into an annotations grid file. The user can set categories for observation, i.e. movement markers, for annotation purposes. Annotations can be organised multi-layered in the so-called tiers. Tiers can be hierarchically interconnected. An annotation can either be time-aligned to the media or it can refer to other existing annotations. The ELAN program has been used for coding movement behaviours during psychotherapy sessions (Lausberg & Sloetjes, 2009). ELAN is written in Javascript.

Parental questionnaires:

In Study 4 pre and post therapy, parents of the participants completed two questionnaires on social behaviour, the Child Behaviour Check List (CBCL, Achenbach et al., 2008) and the Social Responsiveness Scale (SRS, Roeyers et al., 2008). These were meant to assess social responsiveness and social behaviour in the context of daily life.

The CBCL is a standardised questionnaire for parents and caregivers to investigate behavioural or emotional problems in children age 6 - 18 years. For this study the sub-scales

[4] ELAN tool download from: http://www.lat-mpi.eu

"somatic complaints" and "social problems" of the latest Dutch version were used for assessment (Verhulst, Van den Ende & Koot, 1996).

The SRS is a standardised questionnaire for parents and caregivers on the social behaviour of children with ASD age 4 -18 years. For this study the total outcome score of the Dutch version was used (Roeyers et al., 2011).

Self report questionnaires:

In Study 4 the Youth Self Report questionnaire (YSR, Achenbach et al., 2008) was used for the assessment of the participants' s own impression on social responsiveness and behaviour in the context of daily life. The YSR is a standardised questionnaire for children and adolescents. For this study the somatic and social sub-scales of the Dutch version (Verhulst, Van der Ende & Koot, 1997) were used to evaluate therapy outcome as reported by the participant.

The CBCL and YSR have both been indicated as regular routine outcome measurement instruments (ROM) for the Dutch National Health Services (KJP, 2014). Further information about the questionnaires is available in Appendix 11.

3.8 Data-analysis

The analysis of qualitative data throughout all studies was in the first place performed descriptively. The descriptive data were then organised into graphs and tables for visual data analysis (cf. Buchanan, 2008) and for statistical inspection.

For Study 1 the continuous data of within-subject development of interpersonal relating behaviours, obtained with the SEAM observation scale, were analysed over four time points throughout therapy. SEAM behaviours were rated nominally as being *present* or *not present*, which yielded categorical data for the single SEAM observation categories as well as for the composition of multiple SEAM categories. All data were analysed for outcome profiles with graphical analysis.

As the data sets all were based on a very small number of participants, no parametrical statistical analysis has been applied, but instead they were analysed for significance of changes within-subject and changes in group averages with non-parametric test procedures (Siegel, 1956). A Friedman rank procedure, as the non-parametric analogue of the ANOVA, was applied to test for significance of the variations of measurement outcome over time (Friedman, 1937).

For Study 2 the analysis of the open coding of the therapist's intervention behaviour was performed with a grounded theory based qualitative content analysis of themes and structures. The outcome of this analysis served as a conceptual frame for describing the contents and dynamics of the therapist's behaviour in the specific DMP intervention.

In Study 3 the interrater agreement was analysed. A sign test was performed to test the consensus data found between the raters and compare it with a chance distribution. Interrater agreement was calculated to examine the agreement between multiple observers on the assignment of the SEAM categories. Interrater agreement was calculated by means of Cohen's kappa. The range for agreement is expressed in k 0 – 1.0 with larger numbers indicating higher agreement between raters. Interpretation varies from 0.0 - 0.20 = slight agreement, 0.21 - 0.40 = fair agreement, 0.41 - 0.60 = moderate agreement, 0.61 - 0.80 = substantial agreement and 0.81 – 1.0 = almost perfect agreement (Landis & Koch, 1977)

The movement raters' assessment of training procedures and use of the SEAM observation scale was analysed through qualitative analysis for themes and structural aspects as they were reported by the individual raters. These outcomes were then summarised in a narrative evaluation of the training and coding processes.

For Study 4 quantitative data for each participant were collected with the SEAM observation scale and with the social questionnaires before and after the DMP therapy. These data were compared to outcomes of data from the SEAM observation scale, collected at four time points throughout the therapy that had been determined in advance.
Graphical analysis was applied on these data for within subject calculations and for group averages. As the data set for this study only covered a very small number of participants, non-parametric statistical tests were used (Field, 2009). A non-parametric paired samples procedures, the Wilcoxon Signed-Rank test was performed to test for the significances of the changes between measures obtained pre and post therapy (Wilcoxon, 1945). A Friedman rank procedure was applied to test for significance in the variations of measurement outcomes over time points throughout therapy.

To account for the clinical significance of the outcome changes between pre and post therapy, a gain score analysis was applied on the data from the SEAM observation scale and on the data from the social questionnaires.

All graphical analyses and numerical analyses were performed through Microsoft Excel, version 2011 for Mac and SPSS, version 20.

Chapter 4

Study 1: Shared moments

"…a potential cannot be given or rehearsed – a potential has to be ….found…"
(Wayne Shorter, 2013 during an interview on ARTE television, 25-8-2013)

4.1 Introduction

This chapter will elaborate the steps that were taken to explore interpersonal movement behaviours of ASD participants in a retrospective content analysis of clinical DMP cases-vignettes. It will show how from an experientially informed perspective descriptions of movement behaviours were generated from the observation of video-vignettes. The validity of observables for evaluation of interpersonal content found will be considered. Qualitative as well quantitative procedures of movement analysis will be shown from data obtained through retrospective observation of video-vignettes of clinical DMP with ASD participants. The chapter will show how obtained movement markers of interpersonal relating were modelled into an observation inventory for interpersonal movement behaviours.

4.2 Movement Analysis

Research studies on DMP interventions face a considerable problem right from the start. To measure effects of the intervention validated measurement instruments would be preferred, yet standardised instruments like e.g. questionnaires are often based on verbal structures. The movement process however is an embodied, experiential event, with its own nonverbal dynamics. Research on embodied and movement actions needs to take this into account.

There is a long tradition in psychopathology to describe movement features as part of psychiatric syndromes (e.g. Kraepelin 1896). Since the third edition of the Diagnostic Statistical Manual (DSM III) nonverbal symptom clusters are common criteria in the statistical description of psychopathology. However, these nonverbal markers are formulated as very general body or movement related characteristics, from which it is not possible to differentiate between psycho-diagnostic categories.

Common movement observation systems in DMP are mostly based on the systematic, qualitative movement analysis system that was developed by Rudolf Laban, the "Laban Movement Analysis" (LMA) (Laban, 1980; Bartenieff & Lewis, 2002). LMA analyses movement patterns for the use of body and space, the quality of shape, the tension and flow of the action. The specific combination of spatial (direct vs. indirect), time (sudden vs. sustain) and energy (strong vs. light) aspects determine the character and quality of a movement action. The outcome of movement analysis is usually summarised into movement profiles. As the composing movement elements are described in objective, non-interpretive terms, a movement profile gives a summary of the personal characteristics of a mover without interpreting towards personality aspects or negative clinical symptoms.

LMA is applicable regardless the context of the movement event. LMA is widely used in DMP for diagnostic means and treatment planning. Other movement observation systems like the "Kestenberg Movement Profile" (KMP) (Kestenberg-Amighi, Loman, Lewis & Sossin, 1999) and "Movement Psychodiagnostic Inventory" (Davis et al., 2007) have their origins in LMA.

A movement profile is meant to assess the movement capacities and strengths and helps to identify gaps in the movement repertoire (Bartenieff & Lewis, 2002). This analysis provides potential movement material that a therapist might address in order to join the kinetic patterns of the client. Movement profiling prior, during and post therapy permits to monitor changes in movement behaviour over time.

Other observational instruments like "BAST" (Lausberg, 1997), and the "Dance Movement Assessment" procedure (Bräuninger & Zueger, 2007) work from pre-set movement tasks – which participants are asked to perform. They assess the performative quality of the requested movement actions. These instruments typically are used in pre-post treatment assessments to inventory changes in movement performance after DMP.

The observational methods described above inventory movement actions without specific attention to the context in which they occur. In the Kestenberg movement profile, though, the individual profiles of two movers can be related to each other to generate information about similarities or oppositions in rhythm or tension flow. Within the individual's profile the changes in shape flow for example are considered to capture the adaptive moving towards or away from a stimulus, the shaping in spatial planes is considered to capture the individual's adaptive motion around or with a partner or object.

The existing accounts do not use movement categories that include a social intention of one mover towards the other. In this sense they are not suitable to capture the outcome of DMP intervention on social relating of the ASD child that had been described by parents and therapist likewise. To evaluate DMP outcome in terms of interpersonal relating, it would be useful to find and define observable movement aspects that indicate the impulse to engagement or attunement of the participant towards a partner or towards the shared movement situation. A retrospective analysis of cases that had been evaluated with a positive outcome on interpersonal relating may deliver the missing observable movement markers for this domain.

4.3 Retrospective analysis of movement markers of the interpersonal engagement and attunement in children with ASD during the DMP intervention

The aim of the first study was to monitor changes in interpersonal engagement throughout therapy process and identify these changes through movement specific markers. Obtained markers of (change in) interpersonal movement behaviour may contribute to evaluation of the effect of DMP on the social engagement and attunement behaviour in terms of measurable criteria.

The study was conducted as a retrospective explorative observation of video samples of DMP. Retrospective observational studies are considered to be "best suited to the construction of sequences of significant events" (de Vaus, 2006, p. 269). Sequential behavioural observations facilitate exploration of experiential phenomena that occur and

change over time (Knoblauch, Schnettler & Raab, 2009). The domain of interest for the observation within this study was the ASD child's nonverbal intersubjective engagement and attunement behaviour in the therapeutic dyad. More specific, the focus was defined to the interactional impulses initiated by the participants towards the therapist as observed in movement actions.

Data-collection was taken from already available video-material of dance movement therapies, that according to the reports of parents, caregivers and participants had shown a positive effect on interpersonal attunement. Due to the reported positive effect, it was expected that this material would reveal changes in the autistic child's interpersonal movement behaviour throughout the therapy process.

The cases that were analysed for this study were originally not conducted for the sake of research, which offered the opportunity to conduct an observational study of the natural therapy situation within the clinical context without any deformations for the sake of research.

Video-samples for this study were taken from available material of clinical cases DMP with participants diagnosed with ASD by clinical child-psychiatric diagnostics. Four cases were selected that matched in length of therapy and therapeutic approach. The participants in these therapies were two male, two female, with quite a span in their ages, 6.3, 12.5, 12.1, 17.2 years respectively. The intervention had been conducted as regular DMP in outpatient setting.

The researcher, who also was the therapist in all cases, performed the movement observations of the DMP sessions. Data-analysis followed a qualitative approach first to assemble movement markers of interpersonal relating behaviours. In a second analysis a list of these behavioural markers was used to conduct a quantitative analysis on the interpersonal relating behaviours at several time points throughout therapy.

4.4 Content analysis through open coding procedures

For the retrospective observation video-material was selected from previously taped material. Selected cases met the following criteria:

- an example of dyadic DMP with a child or adolescent participant with ASD
- DMP treatment was conducted in an outpatient setting
- the available video-material covered an approximately similar period of time for each case.

All video samples were scanned on their quality for observation. As the video material had not been specifically produced for movement observation, it was scanned for observable scenes. Only sequences where participant and therapist were both visible on the screen were used for the movement observations. From all video samples the sound track was removed, in order to focus the observation on the movement only.

The obtained material was then scanned with an open coding procedure (Glaser, 1992) by the therapist-researcher. The therapist's felt sense (Gendlin, 1989) served as a first kinaesthetic, experiential indicator of changes in the intersubjective relating. Under this experiential perspective she identified and selected moments of interpersonal engagement and attunement behaviour between the therapist and the child. As the initial focus lay on changes of the child's interpersonal relating, behaviours of interest were narrowed to movements that were initiated by the child and that carried an interpersonal intention. As an observer the therapist quasi relived the kinaesthetic experience of the movement interaction with the child. This led to a collection of video scenes of the ASD participants' engagement towards interpersonal relating, as it was perceived through the therapist's kinaesthetic attention.

During the selection procedure journal notes were kept to conceptualise and model the experiential data in the perspective of social relating, and more specifically in the perspective of social relating in dance and movement and in social relating in ASD.

4.4.2 Findings from open coding procedure

The collected moments of change in interpersonal relating behaviour were taken as raw data. In an ascending type of analysis with Laban based movement analysis the scenes were scanned for the movement components present in the actions of the participants. The experiential categories were clustered into components of movement behaviour,
These categories could be clustered in overarching movement themes with regard to the use of space, time and weight. This delivered a first list of observables.

Outcome open coding interpersonal movement behaviours throughout DMP with ASD child:	
Overarching theme clusters:	**Interpersonal Movement Behaviour as observed:**
Observed interpersonal movement behaviour in terms of space:	– participant directs movements towards therapist or partner: – participant is looking at/away to/from therapist or partner – participant directs body-parts towards/away the therapist or partner – participant directs whole body towards/away the therapist or partner
Observed interpersonal movement behaviour in terms of time:	– participant synchronises in rhythm with therapist or partner – participant synchronises in phrasing therapist or partner – participant counter-plays rhythm therapist or partner – participant counter-plays phrasing therapist or partner
Observed interpersonal movement behaviour in terms of weight/strength:	– participant gives into weight during individual movement – participant gives/takes weight to movement with therapist or partner – participant gives/takes weight (e.g. leaning, light touch) with therapist or partner – participant regulates weight towards therapist or partner

Table 2: Outcome retrospective analysis of interpersonal movement behaviours of ASD participants during DMP

The movement material was further clarified from the journal notes taken during the observations. The movement material that was collected from the DMP sessions with ASD was also related to movement material from two workshops with DMP students that were originally held to generate video-material on dyadic movement improvisations for the input for the fMRI scanning procedures that were planned in the first set-up of this study. Expert movers were invited into moving dyads. The nonverbal relation was offered as thematic focus for the duet improvisations. More specific the student's sense of being connected or disconnected to their dance partner, embodied movement pathways toward felt shared movement and vice versa: from felt and intentionally shared movement away towards disconnection and solo dance improvisation.

The movement elements that appeared during these improvisations on the dancer's subjective experience of connectedness to or separation from their duet partner seemed to match very well the movement elements that had been selected from video-vignettes of DMP in the clinical setting with ASD participants.

The obtained movement markers were then used for a trial selective coding procedure. In a descending way of coding, the video-material was scanned with the structures found. Video-vignettes were first tagged for the presence of overarching themes (spatial, weight, time involvement) and then, in a following round, the specific movement categories that were present in the action at hand were assigned to the selected section.

On the basis of these trial observations the list of movement markers was fine-tuned towards a more sober list. This observation list was tested by the therapist for the video-samples from therapy. The list was also used in a try-out version by three other expert movement analysts on video vignettes from the student's dyadic movement improvisations. The obtained movement categories and items were very well applicable for the observation of dyadic improvisations.

Multiple observers agreed on these categories (see also Chapter 7). From open coding the use of spatial categories were subdivided in *movement direction towards or actively away from partner*, *whole body or body part directed towards or actively away from partner*, *facial orientation towards partner*. A diversity of movement actions may fit into the single categories and items. Image 1 shows examples of variations within dyadic movement elements. The item *movement direction* for example may cover movement of a hand or full body movement. In terms of interpersonal movement actions the fact that it is directed towards movement partner is considered more important than the differentiation on body level in partial or full body involvement.

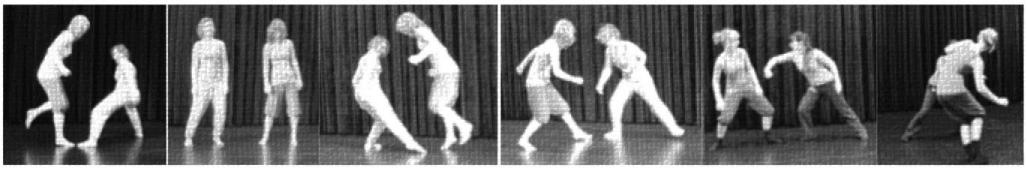


Figure 2: Variations within the category 'movement direction'

Although a variety of movement behaviours may fit into the individual categories, the observers showed relatively high agreement in their rating of different interpersonal behaviours in terms of the obtained movement markers. This spontaneous agreement between observers from open joint observation on the interpersonal movement markers was taken as a first indicator for the applicability of the obtained movement items to capture the behaviours of interest. In the perspective of the development of a measurement instrument the agreement between observers might also be considered as *face-validity* on the obtained movement items (Sapsford, 2006). After the trial-observations the movement markers were again fine-tuned and defined for the specific movement behaviour they covered. The trial-observations also delivered a format on how to structure the movement observation in terms of annotation procedures. The movement markers in themselves formed a qualitative observation tool, which by means of the annotation procedure could cover quantitative aspects, like frequency and duration of the movements observed.

The movement markers in the observation list now were defined for their specific content and the potential annotation structures.

The annotation procedure that seemed to be most useful for a first analysis of the raw video-material was an aggregation of movement categories within a set time-frame, e.g. 45 sec or 60 sec samples were scanned for the presence of the individual movement categories during the time fragment.

The qualitative content of the annotation categories was defined as follows:

Spatial orientation:

In this domain the direction of the action of the child is annotated. Spatial interpersonal markers might involve movements towards the therapist or away from the therapist.

For the category spatial orientation three items were defined:

- **facial orientation -** the participant directs his/her face towards the therapist
- **direction body parts/whole body -** the participant directs body parts or the whole body towards the therapist
- **movement direction -** the participant actively directs movement towards or away from the therapist

Weight engagement:

In this domain the use of weight by the child during dyadic movement is annotated. Weight engagement might involve active weight engagement (use of force) or passive weight engagement.

For the category (weight) engagement three items were defined:

- **weight engagement individual -** the participant makes active or passive use of weight during *individual movements*
- **weight engagement with partner -** the participant puts passive or active weight to the therapist/the shared movement - this might show during the use of props (e.g. sticks, physioballs etc.)

- **weight regulation with partner -** the participant regulates his/her weight according to the actions of the partner (no impulsive breakthroughs, no clashes)

Time regulation:

In this domain the use of time by the child during dyadic movement is annotated. Time regulation might involve adjusting or counter-playing to the timing of the therapist.
For the category time regulation two items were defined:

- **synchronisation in rhythm -** the participant synchronises to the rhythm of the partner
- **synchronisation in phrasing -** the participant synchronises to the phrasing of the partner

The item "facial orientation" replaced an earlier item "gaze direction", because it had shown that the participant while moving might turn into directions where it was not possible to follow the eye-gaze. However, facial orientation seemed to be observable from several perspectives and in the trials in Study 3 it seemed to be a distinguishable movement action for other analysts as well. In the literature a similar choice and motivation was found in Dulicai's DMP observation system for family interactions (Dulicai, 2010).

The obtained markers were critically annotated from additional literature research. In research studies on interpersonal engagement in ASD (Field et al., 2001; Ingersoll et al., 2007; Mundy, Sigman, Ungerer & Sherman, 2014) some similar markers for the evaluation of nonverbal social behaviour in children with ASD were found. Also some practice-based research studies on nonverbal communication with children with ASD seemed to use some similar items (Robins, Dickerson & Dautenhahn, 2005 & 2009; Dawson & Galpert, 1990;

Escalona et al., 2002). These studies supported the assumption that nonverbal markers are useful to assess the child's interpersonal engagement.

However, the items on weight engagement and weight regulation and the items on synchronisation in rhythm and synchronisation phrasing that were collected with movement observation from the DMP materials could not be identified in other studies. Although some authors indicated dyadic synchronisation as a potential movement theme that might help to develop empathy (Behrends, et al., 2012; Trevarthen & Delafield-Butt, 2013; Amos, 2013) no movement studies on the ASD child's use of synchronisation was found. Some authors (Schumacher & Calvet, 2008; Hardy & LaGasse, 2013; Overy & Molnar-Szakacs, 2009; Poismans, 2009) in the field of music therapy explored synchronisation processes between players in timing of musical (sound) production. In itself synchronisation in sound production requires a motor act and might therefore in the very essence be considered a similar phenomenon as the synchronisation of movement rhythms and movement phrases as were observed in the DMP material.

In the literature on the social relating of the ASD child a broad scale of observables and concepts are in use to characterise activities of social relating. This diversity makes it difficult to compare and differentiate study outcomes. Also the type of interpersonal relating that is subject of the observation may vary between studies. From the literature reviewed the ASD specific features in social relating a couple of thematic clusters have been found in social orienting, social engagement and social attunement.

Contrasting these clusters with the clusters found during open coding from a kinaesthetic perspective, it shows that the latter have been described as patterns of social relating in early development and that they connect to preverbal and pre-conceptual patterns of dyadic relating (Beebe et al., 2010; Bullowa, 1979; Trevarthen & Aitken, 2001; Stern, 2010).

From the perspective of movement analysis we find that the orientation towards the movement partner happens through spatial adjustments, like in the observed actions of the gaze that is shifted towards a partner or the body direction that is adjusted to that of a partner. Similarly interpersonal engagement may be understood as a result of the use of weight towards the movement partner, in the observed actions a person put weight towards the partner to make an impact on the shared movement actions. The regulations of the interpersonal relating showed in the movement observations during active regulation of weight towards a partner, to avoid clashes for example and during regulation of timing in rhythm and phrasing in order to adjust to the partners movement timing. Hence, it is proposed that the differentiation in social orienting, engaging and regulating behaviours is paralleled and covered by spatial, time and weight aspects of movement actions found during interpersonal relating. It is through their synergy that they contribute to the quality of the interpersonal attunement in the relational dyad. From a kinaesthetic perspective attunement thus might be considered as the synergetic sensitive use and regulation of spatial, weight and time aspects in the interpersonal relating. To express this synergetic perspective the collection of movement markers on interpersonal relating was indicated as "Social Engagement and Attunement Movement" (SEAM) markers.

4.4.3 Data-collection with the SEAM coding procedure

The obtained observational markers were then used to investigate how SEAM behaviours of the ASD participants developed throughout DMP therapy process. The movement markers were organised into short items and listed in an observation scale. By scaling the items it was possible to conduct a selective observation procedure that focused on the interpersonal movement aspects.

To assure comparable outcome across cases the video-material was scanned for similarity of therapy process structures. Selected cases met the following criteria:

- an example of dyadic DMP with a child or adolescent participant with ASD

- DMP treatment was conducted in an outpatient setting

- the available video-material covered an approximately similar period of time for each case

- the material covered approximately similar therapy durations so that it was possible to pick vignettes from comparable time-points of the therapy process

The video-material was organised under two perspectives:

- start – end phase of the therapy

- on-going process throughout therapy process.

Four time-points (TP) per case were selected for the SEAM analysis, a session in the start phase of the therapy as time point 1 (TP 1), a session at 1/3 and one at 2/3 of the process as time points 2 and 3 (TP 2 and TP 3) and a session in the end phase as time point 4 (TP 4).

The video-material was annotated with the SEAM observation scale by the researcher. As the material originally had not been produced for the sake of research it was scanned for observable vignettes. First for each case, a compilation was made of all intervals from a session in which both therapist and participant were visible. Then, from this compilation the most central five minutes of a session were chosen as the vignette for observation (fig. 3, area marked blue). This delivered a randomised the sample of five minutes video-material for each time point for each case. The video-material was annotated after every full minute, behaviours were annotated as either being present x or not present .

SEAM I observation sheet																																	
partcipant: 4 ss: 1	nv																																
behaviour/min.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
movem. direct.									x		x	x						x	x	x	x													
facial orient.		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x					
body direct		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x		x		x	x	x	x						
weight engage. Ind.		x		x	x	x	x		x	x	x	x	x	x	x					x	x	x	x	x	x	x	x						
weight eng. partner																		x	x	x	x													
weight reg. partner																	x																	
sync rhtythm										x					x					x	x					x								
sync phrase																																		

Figure 2: An example of completed SEAM coding sheet

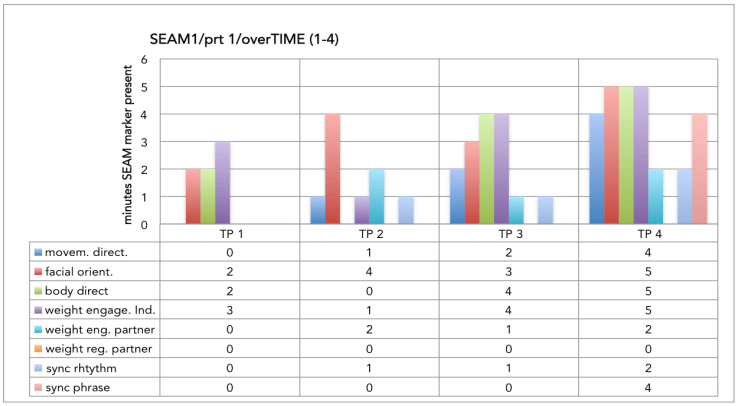
This coding procedure produced categorical data on SEAM behaviours throughout therapy per case.

From the obtained data a SEAM profile per time point per case was generated. The nominal outcome of this procedure enabled a quantitative evaluation of SEAM behaviours throughout therapy.

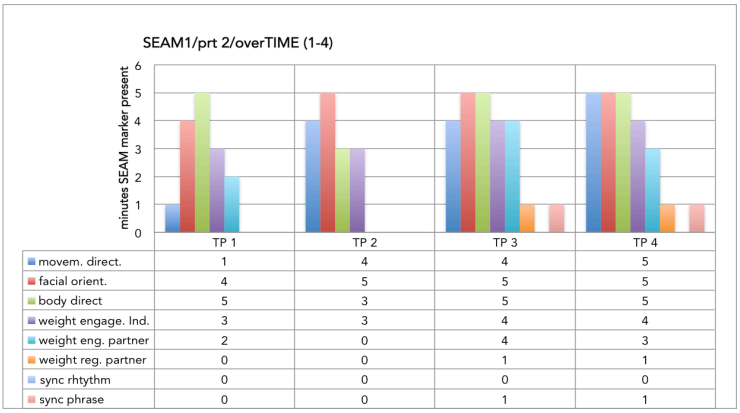
To search for patterns of SEAM behaviour throughout therapy process per case and across cases the SEAM profiles were summarised into visual graphics.

4.4.4 Findings from the SEAM coding procedure

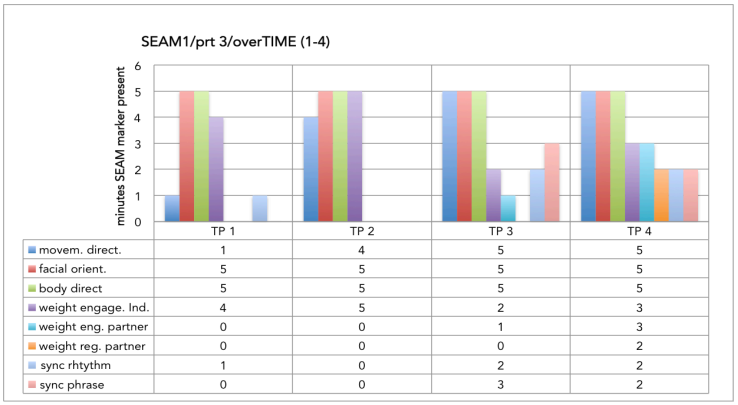
From the obtained data the profile of SEAM markers present at the four observed time points was calculated for each case individually as a within-subject calculation and across all the cases together as an average group calculation.



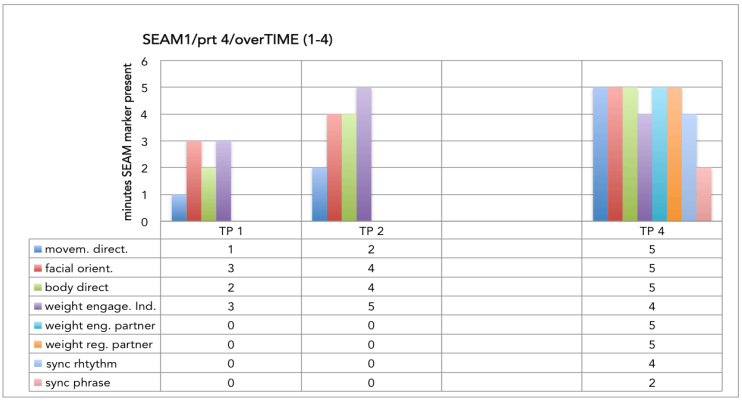
	TP 1	TP 2	TP 3	TP 4
movem. direct.	0	1	2	4
facial orient.	2	4	3	5
body direct	2	0	4	5
weight engage. Ind.	3	1	4	5
weight eng. partner	0	2	1	2
weight reg. partner	0	0	0	0
sync rhtythm	0	1	1	2
sync phrase	0	0	0	4



	TP 1	TP 2	TP 3	TP 4
movem. direct.	1	4	4	5
facial orient.	4	5	5	5
body direct	5	3	5	5
weight engage. Ind.	3	3	4	4
weight eng. partner	2	0	4	3
weight reg. partner	0	0	1	1
sync rhtythm	0	0	0	0
sync phrase	0	0	1	1



	TP 1	TP 2	TP 3	TP 4
movem. direct.	1	4	5	5
facial orient.	5	5	5	5
body direct	5	5	5	5
weight engage. Ind.	4	5	2	3
weight eng. partner	0	0	1	3
weight reg. partner	0	0	0	2
sync rhtythm	1	0	2	2
sync phrase	0	0	3	2



	TP 1	TP 2		TP 4
movem. direct.	1	2		5
facial orient.	3	4		5
body direct	2	4		5
weight engage. Ind.	3	5		4
weight eng. partner	0	0		5
weight reg. partner	0	0		5
sync rhtythm	0	0		4
sync phrase	0	0		2

Figure 3: Graphical summary of the individual profiles of SEAM scores at TP1, TP2, TP3, TP4

In all four cases the scores showed an increase within the SEAM categories that were involved in the child's actions in the shared movement situation. Moreover, the profiles revealed that in the course of the therapy the number of movement markers involved in interpersonal relating did build up. All individual profiles did show the use of the categories of *spatial orienting* at TP 1 and throughout all other TP's. None of the profiles showed the use of *weight regulation* towards the partner at TP 1, only one profile showed *weight engagement* towards the partner at TP 1. *Synchronisation in rhythm* was only found in one profile at TP 1 and *synchronisation in phrasing* was not present in any of the profiles at TP 1. In all profiles these categories developed throughout therapy, two profiles showed all SEAM categories at TP 4, the other two showed seven of the eight SEAM behaviours present at TP 4.

In all cases the movement engagement at TP 4 showed a combination of spatial, weight and time movement aspects, which was not the case in the profiles at TP 1. Hence, SEAM behaviours showed a tendency towards higher complexity towards TP 4 with in addition the tendency to use all SEAM qualities more frequently.

Although the profiles show individual variations in the development throughout the 4 measurements, there seems to be a trend that orienting actions develop prior to weight engagement towards partner and weight regulating towards partner actions. Furthermore, the synchronisation items seem to occur only after weight engagement and weight regulation have evolved in the child's SEAM repertoire.

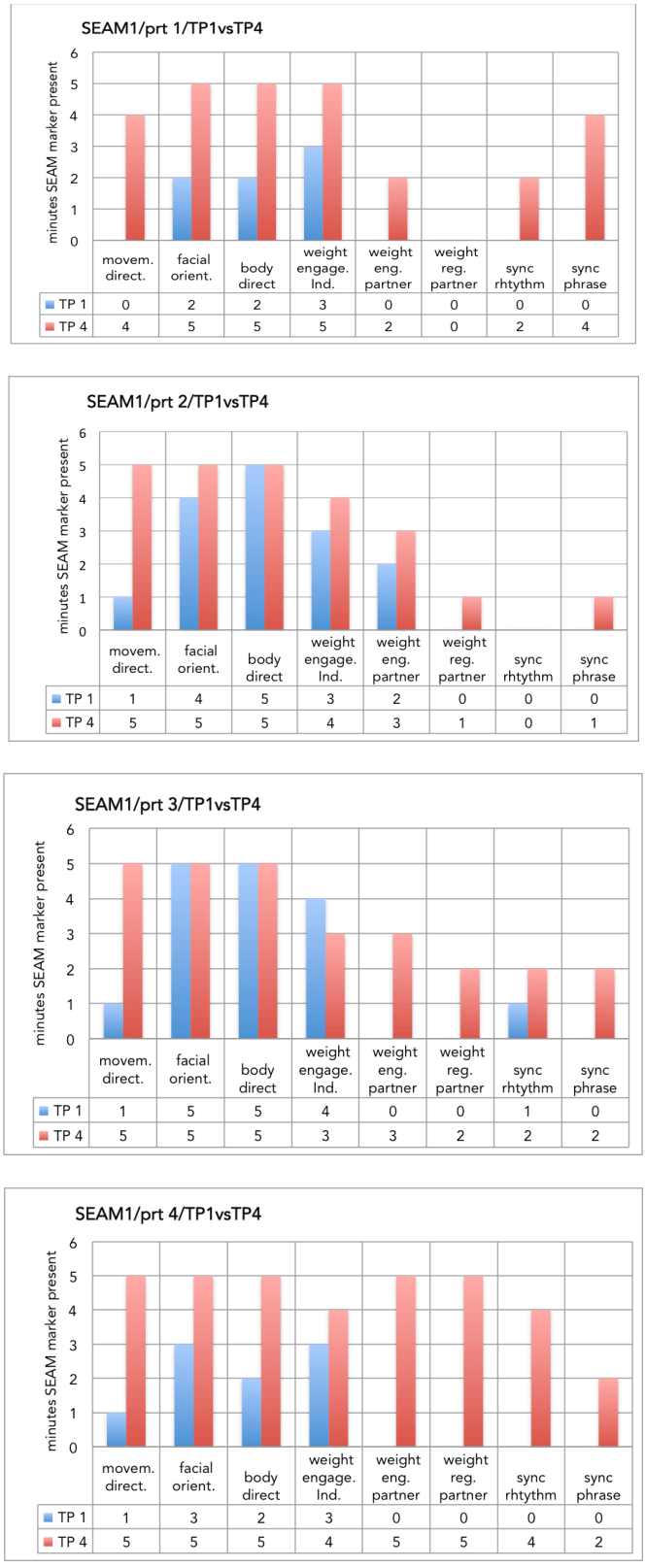
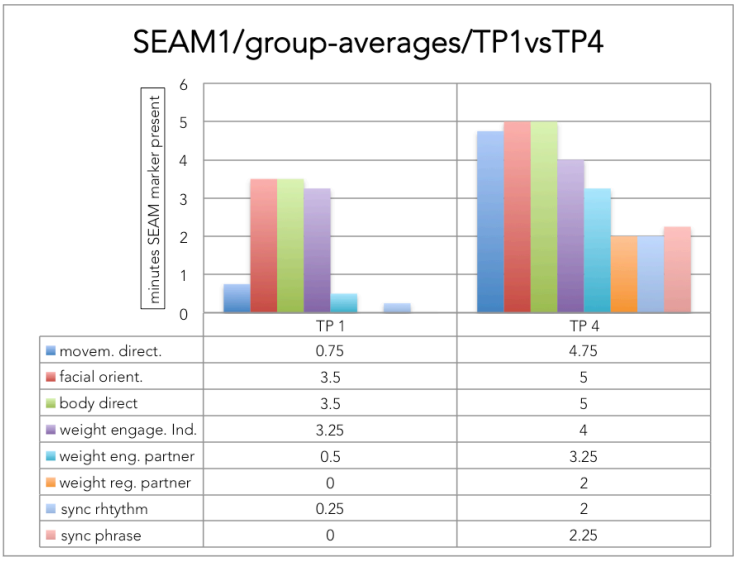


Figure 4: Graphical summary for all participants of the changes in scores for single SEAM categories between TP1 and TP4

To show the overall trend across the four cases the outcomes of the individual profiles were summarised into group average SEAM profiles. For the group average a comparison of profile as taken from the start phase (TP 1) of the DMP and as taken from the end phase of therapy (TP 4) showed an increase for each SEAM marker between time points, as well as an increase for the complexity of SEAM profiles (movement markers involved).

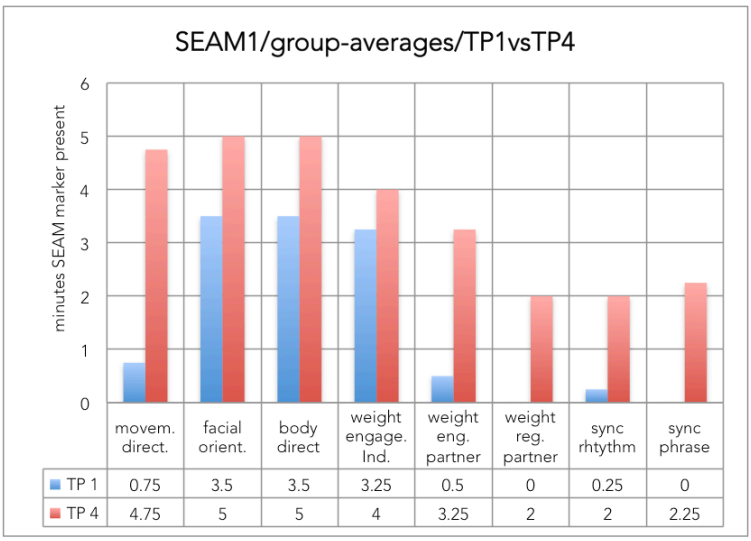
Graph 1: Graphical summary of differences in the average group SEAM profile between start and end of DMP



The differences among repeated measures of the group average SEAM scores over time (TP1- TP4) were calculated with a non-parametric Friedman test. It rendered a Chi-square value $\chi^2 = 7.95$, which was significant, $p < .0028$. A non-parametric analogue for the paired t-test, the Wilcoxon Signed-Rank test indicated with $Z = -2.527$ and a p-value $p = .012$ that median scores of the group averages on the SEAM observation scale at the end of therapy (TP 4) were significantly higher than the median scores in the beginning of treatment (TP 1).

The small number of cases involved in this study of course protects us from unwarranted conclusions that may be drawn from these data. The results obtained, however, may indicate a trend in which SEAM behaviours change and develop through and throughout DMP intervention.

Graph 2: Graphical summary of differences in the group averages of the single SEAM categories between start and end of DMP



4.5 Discussion

Through retrospective observation of changes in interpersonal movement behaviour with an open coding procedure movement actions of interpersonal relating could be identified. Throughout DMP therapies children with ASD used actions of spatial orienting, weight engagement and regulation and synchronisation in time towards a movement partner or a shared movement activity, all of which are closely related to interpersonal interaction patterns of the early dyad.

The obtained markers for interpersonal engagement and attunement were applied in a selective coding procedure and showed to be useful to monitor SEAM behaviours throughout DMP therapy process with ASD participants.

Selective coding showed changes if SEAM behaviours throughout therapy process with a tendency for the participant's action to increasingly integrate more SEAM markers during interpersonal movement actions. SEAM behaviour during the end-phase of therapy seemed to consist of a more integrated use of spatial orientation, weight engagement and regulation and synchronisation in time patterns.

These results seem to cover the outcome reports of parents and other caregivers regarding a more attuned way of relating of the ASD child with peers and adults after DMP intervention. The non-parametrical rank analyses showed a highly significant development of SEAM markers throughout therapy. These results should be interpreted very carefully, as the low number of cases involved does not allow for any generalizing conclusions. However, the findings point towards a trend of increase of SEAM in participants with ASD throughout DMP. The SEAM observation scale that was an outcome of the open coding procedure seems to serve well as in instrument to capture the movement content of changes in interpersonal relating of the ASD participant in DMP.

We find as a result that a more fully integrated profile of SEAM, the more coordinated/integrated use of spatial orientation, weight engagement and regulation and synchronisation in time patterns the more the child seems able to attune to a partner during shared actions. At the same time, a more integrated use of SEAM provides more action cues for the movement partner to attune to the child's movement patterns and might therefore support engagement by others with the ASD child.

The results of open coding and selective coding led to a first conceptualisation of a movement informed view on interpersonal relating in ASD. Spatial orienting, weight engagement and regulation, synchronisation in time structures may be considered as developmental steps that together enable the ASD child to attune to a partner and participate

in shared actions. A movement informed perspective might contribute to enactive approaches on social engagement of children with ASD, which suggest that social sense-making and social relating evolve from participation in shared actions (De Jaegher, 2013). The dynamics of shared movement experiences contribute to mutual corporeal responsiveness in the movement relation. The SEAM elements enable a conscientious observation and analysis of the constituting elements during these processes. For the therapist they may offer a means to analyse the ASD child's movement patterns and support to find movement actions that connect well to the participant's input to the movement situation. A more integral use of SEAM behaviour as seen in the course of DMP intervention might provide the ASD child with the experiential means to responsively move with a partner's movement repertoire and experientially understand intentions and meanings of actions thus provide the base to co-regulate the shared movement situation. The enactive quality locates these experiences in the direct bodily existence, which may contribute to the embodied transfer towards other contexts than that of therapy.

The SEAM markers were summarised into an observation list that might serve as a therapy outcome evaluation tool with regard to interpersonal attunement behaviour in the ASD participant. The selective coding procedure showed the efficacy of the obtained SEAM markers to evaluate interpersonal movement behaviour throughout DMP. Further steps should show if the outcomes of evaluation with SEAM markers correspond to other, already standardised measures of social relating in children with ASD. Also it would be necessary to show if obtained markers generate satisfactory agreement between multiple observers. The first trial observations with the tool with multiple raters showed strong agreement on spontaneous recognition of the items by other observers than the therapist, which can be taken as positive face validity (Feder & Feder, 1998). The list was later tested for interrater agreement. The outcome of two different rating procedures was compared for inter-rater

agreement. More details on the training for movement analysts and the calculation of interrater agreement will be given in chapter 7.

The outcome of this first research step forms a first contribution to movement analysis of interpersonal relating behaviours.

Chapter 5

Study 2: Observation and analysis of DMP interventions towards shared movement experiences in ASD

"Dance promotes a type of knowledge with and from the body"
(Ribeiro, 2011, p.72)

5.1 Introduction

This chapter presents the second study of the project and it will investigate the interventions that are used during DMP in ASD. Retrospective analysis of video footage of four cases of clinical DMP with young participants with ASD will serve as material to describe DMP interventions. The video materials that were used for this analysis were the same as in the four cases that were analysed in Study 1. The focus of this second study was on the dance-therapeutic context in which the Social Engagement and Attunement Movements (SEAM) appeared.

This chapter will analyse the variations in relational modes and movement interventions offered by the therapist during the intersubjective relating with the child. The outcome of open coding procedures led to a structured overview on the interventions that the therapist

used during dyadic relating with the ASD participant. This chapter will describe the variations in relational modes and movement interventions offered by the therapist to the ASD participants. The interactional structures found in the dyadic interventions of the therapist will be compared to those used by expert movers during dyadic movement experiences. Lastly the practice-based findings will be summarised as Shared Movement Approach toward interpersonal relating in ASD.

5.2 DMP interventions in ASD

Although DMP intervention is quite common in the therapeutic treatment of ASD there are only a small number of papers that describe the specific therapeutic methodology (Loman, 1995; Erfer, 1995; Adler, 2003; Tortora, 2006). Systematic description of interventions is not yet common practice in DMP. As these interventions are based upon dance and movement art forms, they are characterised by at times highly intuitive decisions, which are based upon the sensitive perception of the embodied relation with a client or group of clients (Torrance, 2003; Wengrower, 2010; Devereaux, 2012).

Case reports of dyadic DMP in ASD describe mirroring techniques as the most common intervention (Kalish, 1976; Adler 1968a). On the basis of on-going subtle movement analysis DMPs adjust their own movements to those of the participants. A recent study on DMP outcome by Koch et al. (2014) was based on a manualised treatment procedure. Manualised treatment procedures focus on domain specific subjects such as the development of empathy through DMP (Koch et al., 2014; Behrends et al., 2012). In the literature the therapist's behaviour during these interventions is hardly specified any further. Changes within the style of intervention throughout the therapy process can be found in case study descriptions, but

there are only a few that have conceptualised the therapist's behaviour in terms of movement involvement with the participant.

Loman (1995) differentiates between adjustment, which refers to regulation to shape flow patterns and attunement, which refers to regulation to tension flow patterns. A comprehensive description of mirroring interventions has been presented by Eberhard-Kaechele (2012). Taking mirroring as a basic intervention in DMP, she differentiates towards other relational modes, as among others countermovement, contrasting, variation and complementary interaction; which are all presumed to match interaction specifics throughout developmental phases. Tortora (2010) differentiates between attunement and mirroring, which she both relates to different movement actions. She differentiates within the mirroring mode into three sub-categories, which are mirroring modified, mirroring exaggerated and mirroring diminished. These differentiations do not yet seem to be implemented as common methodological practice in DMP with autistic participants.

Study 1 of the present project has shown the development of interpersonal relatedness of the ASD child during DMP in terms of movement markers. Interpersonal orienting, engagement and attunement are situated behaviours, hence there is an actor and there has to be an addressed other who is to respond to the mover's actions. Therefore this second study is to discern the nonverbal interactional context in which the SEAM behaviours evolved. Research in a natural setting of the clinical treatment may provide insights in the specific nature and characteristics of the actions taken by the DMP therapist. That is why the present study will follow the course of DMP interventions as taken from video footage of on-going clinical DMP practice with young participants with ASD.

As dance interventions utilise expressive gross motor movement through space with highly dynamic qualities it is not always easy to identify which action comes first and forms a

precursor for the movement answer. The researcher faced a considerable problem defining the specific intervening actions of the therapist from the shared momentum and the movement dynamics between movers, while at the same time these very actions constitute and contribute to this momentum i.e. "Who can tell the dancer from the dance?" (Yeats, 1928).

In contrast with manualised interventions, which structure the therapy process into pre-set activities, these being offered to the patient (group) regardless of their own input or specific movement needs at that particular moment, the developmental approach to DMP that is analysed in this study departs from the participants' individual specific characteristics of social relating. The general goal in this DMP approach is to develop interpersonal relating from the action potentials already present in the participants' way of relating. In the first study these action potentials have been formulated through movement markers and have been defined in terms of actions initiated by the participant, intentionally directed towards the movement partner 's actions. Manualised treatment structures seem applicable for groups with high functioning participants with ASD who are able to a certain extent to adjust to presented activities. Younger children with ASD or low functioning participants might not be able to accommodate to such an external movement structure.

5.3 Method: Retrospective analysis of relational modes in DMP

The aim of the second study was to map the movement interventions used by the therapist during developmental dyadic DMP with participants with ASD and to identify the structure and overarching concept of the intervention as seen in the intervention behaviour of the therapist.

For an exploratory study on the therapist's actions during dyadic DMP a practice-based method was applied. Practice-based research on DMP interventions faces the challenge to pair the natural situation of clinical experiences with the systematic observation and collection of research data.

The frame of reference for the second study was the therapeutic relationship, and more specifically nonverbal intersubjective relating between therapist and participant. The guiding question throughout this study was: how does the therapist regulate the interaction with the participant in terms of movement interventions?

An auto-ethnic approach (Gans, 1999) was followed to capture the therapist-researcher's experiential understanding of interpersonal relating within the context of DMP as expressed through social orientation, engagement and attunement. For the exploration into interpersonal interventions in DMP the scenes of shared movement sequences were selected from the video-material that in retrospect to the therapist-researcher's opinion reflected fundamental interpersonal relating in terms of dance or movement. The decision to use the therapist's own experiential information for monitoring and recognizing the significant interactional events within the observed therapies, was based on an understanding of the investigation as a heuristic research process. That is, in the course of the research process the effort to understand the underlying structures of a lived situation (as in this case of the clinical DMP) is itself a complex, *experientially* informed, way of thinking and sense making (Payne, 1993; Ellis, Adams & Bochner, 2011).

Although it could be argued that this would represent a biased approach to the research material, it has been taken here into consideration that the therapies studied are performed within a naturalist context. The situations at hand evolve in the course of the therapy process

in an autonomous way, as if it were a living entity, in an experiential domain built up by the movements of two actors, who both contribute to it. Although such a developing entity can always be approached with predefined tools of measurement and observation, it is their basic lack of conceptual openness that makes those predefined tools less valuable when applied to unique therapeutic processes that are of a developing and autonomous kind. Hence, a hermeneutic approach (Gadamer, 1960), that takes into account, and that departs from, the therapist's own experientially informed position is considered helpful in the formation of those concepts that are most relevant for a structured analysis of the vital components of the therapeutic processes (Fleming, Gaidys & Robb, 2003). In particular, it is helpful in combining the first order experiential knowledge of acting with the second order understanding and interpreting of the expressive movement dialogues (Payne, 1993; Dostal, 2010).

5.3.1 Procedures

This study has used a qualitative research approach.

Grounded theory methodology (Glaser & Strauss, 1967) was used as frame of reference for the steps to conduct the retrospective analysis of videotaped DMP sessions with participants with ASD.

Initially the material was processed with an open coding procedure to annotate the video-material for the therapist's actions during DMP session with young participants with ASD.

An open coding procedure was also used for the initial analysis of therapist's session notes and journals (Glaser, 1998).

The annotated video events were then scanned for underlying structures that could help to categorise the materials. Next the materials were arranged according to the structures obtained during the previous step, which delivered thematic groups of aspects that are

involved in dyadic nonverbal relating in DMP. These thematic groups were considered as organising themes (Ryan & Bernard, 2003) that in turn were composed through and filled with basic actions that had been observed from the therapist's actions.

In a next step, the organising themes and basic actions, that had been obtained from the researcher's experientially pre-informed observations of the dyadic therapist-client interaction, were critically annotated by comparing them to organising themes and basic actions obtained from observations of dyadic movement interactions between expert movers that were not pre-informed through the experiences in the therapeutic dyad (DMPs).

The obtained organising themes and basic actions were then compared to concepts on DMP intervention in ASD that have been reported in the professional field (Ryan & Bernard, 2003).

Finally the observational findings were summarised in an explanatory model for dyadic interventions in DMP with ASD's.

5.3.2 Data collection tools

The data for this study consisted of video samples from DMP sessions in a clinical outpatient setting and from workshops with expert movers.

The ELAN annotation software that has already been described in greater detail for Study 1 was used during the open coding procedure to annotate and label the video material.

The therapist's session notes and journal notes were used for critical cross-examination of the video annotations.

Data on intersubjective relating in the therapeutic dyad were taken from the following:

- retrospective analyses of video samples with open coding procedure.
- retrospective analyses of therapist's session notes and journal notes with open coding procedures.
- retrospective analysis of relational modes and dyadic movement sequences between expert movers.

As the interest for this study was the specific nature of the DMP intervention with participants with ASD, no linear quantitative analysis was applied, but instead all data were analysed with descriptive procedures.
The experientially informed analysis of video-samples from DMP intervention and therapist's journal and session notes were compared to the researcher's journal notes on the analysis of sequences of dyadic movements between expert movers for a critical review and annotation.

5.3.3 Data analysis

All data obtained from the video samples were analysed through a comparative analysis as is used in the grounded theory approach (Strauss & Corbijn, 1994) for similar structures.
First the video material was examined for scenes that to the therapist-researcher's impression reflected a dyadic interpersonal relating in the observed dance and movement interventions with the ASD participant. In this way an experiential understanding of interpersonal relating within the context of DMP was built from the observation of social orientating, interpersonal engagement and interpersonal attunement as expressed in the therapist's

movement behaviour. The selected scenes served as points of reference for an understanding about what interpersonal relating might look like within a DMP context.

The obtained vignettes then were scanned for underlying structures within the therapist's actions as performed in the interpersonal space with the participant. This led to the identification of four organising themes that were considered relevant for dyadic DMP with ASD participants. These themes occurred during single therapy sessions as well as in the course of therapy sessions. All organising themes were described and illustrated with examples of observed therapist actions in order to determine basic themes.

Open coding:	Retrospective analysis of DMP intervention with young participants with ASD as taken from video samples of clinical DMP			
Data obtained from open coding procedure were grouped into themes that organise the therapy process:				
Organizing themes:	Procedural structures of the therapy process	Structure of session	Relational modes	Movement actions

Table 3: Organising themes after the first open coding analysis of video materials from DMP with ASD participants

5.3.4 Participants

During the observation of the DMP samples the focus of this study has been on the actions of the therapist-researcher. Participants in the DMP sessions were part of the analysis to the extent that they were the persons addressed by the therapist's actions.

The research journal also covered notes from a workshop with 'expert movers' with DMP students, who at the time had no educational or other relationship to the researcher, and to whom the possibility of attending the workshop on a voluntary basis was offered.

5.3.5 Ethics

All participants in the DMP video material that was used during this study had given their written consent for the use of this material for research purposes or retrospective analysis. Participants in the DMP workshops gave their written consent for use of the video material for research purposes and for the use of photo material for illustration purposes.

Video materials were stored on an external hard disk that was safeguarded with password protection. The hardware was stored in secluded lockers. All materials were rendered anonymous; all personal identification was removed from the files and they were saved with randomised numeric codes.

5.4 Results

5.4.1 Description of the organising theme 'Procedural structures of therapy process'

The procedural structures of the outpatient setting where this research took place are deeply influenced by the institute's policy of shared decision-making with respect to treatment plans. A particular model for the dialogue between patients and mental health professionals is being used that describes how to discuss, agree and evaluate treatment choices (Westermann, Verheij, Winkens, Verhulst, & Van Oort, 2013). This model can be regarded as a format that regulates the decision processes of all therapies provided throughout the various therapy programmes. Agreement on treatment programme and treatment goals serve as a basis for the specific appointments made between therapist and client. This also applies to DMP with

ASD. Features of this policy were found in therapeutic activities during the analysis of the DMP sessions, for example, when during short oral evaluations at the end of a session, the therapist or the child commented on movement situations from that session that were specifically suitable in sight of agreed goals.

5.4.2 Description of the organising theme 'structural aspects of DMP session'

The analysis of the video material together with the analysis of session notes and therapist's journal revealed a basic structure in many of the DMP sessions. The general structure seemed to recur during all phases of the DMP treatment and was recognisable in all observed cases once it was documented. Components of this structure were:

A. Opening. This part serves to make the transition from everyday life towards the therapy session – therapist connects to the participant's narratives and directs the attention towards the movement session.

B. Warming up. This part serves to direct the focus of attention towards the body and the actual movement qualities at hand. The therapist supports exploration of movement elements, introduces movements, responds sensitively to new movement impulses, supports momentum.

C. Structured games and dance/movement activities. These movement activities are organised according to well-known structures for dance and movement activities, for example ball games or martial arts forms. The ASD participant often choses this type of activity during the starting phase of the session. These activities offer clearly delineated action potentials, which are organised according to familiar structures for interpersonal action. The therapist joins into the structure of these games and takes them as a starting point for the exploration of enclosed movement themes that relate to dyadic orienting,

engagement and attunement. For example in baseball many actions of synchronisation are part of the movement actions used, e.g. in bouncing a ball to a partner; another example of a structured movement activity with enclosed dyadic themes is dodge ball, where the movement actions of bodily orienting and directing towards other players are necessary to avoid hits.

D. Open movement activities. These movement activities do not have a pre-set structure or content. Usually they are characterised by an open-ended structure in which movement themes can unfold. Starting point for improvisations can be found in the use of props or in the variation of movement actions. The participant's movement actions form the basis for movement exploration. The therapist approaches these movements as dance material and examines them for their kinaesthetic qualities.

E. Closure. During this part movement experiences are offered to the participant, which are meant to close the movement themes of the session and to make the transition to everyday life.

Within the sessions of 45 minutes the elements C and D appeared in varying sequences. Sometimes these would be shorter periods of alternation between blocks C and D.

Examples of session sequence:

A – B – D – D – C – D – E

A – B – C – D – E

A – B – D – C – C – D - E

The elements A, B and E served as a holding structure and had a fixed place in the DMP session. This structure was agreed with the participants as a pre-set frame for the sessions. Whenever a participant did not adjust to this structure, the therapist offered a "reminder", but when this was ignored she chose to follow the client's dynamics.

5.4.3 Description of the organising theme 'relational modes'

For the relational modes used by the therapist throughout DMP four general categories were extracted from the observed material: (a) witnessing (b) joint movement (c) movement dialogue (d) other.

Ad (a): *witnessing mode - giving space for individual movement experiences*

During witnessing phases the therapist does not move – but takes a position in space that allows following the movement activities of the participant attentively, without judgement. Usually during these phases the therapist is beyond the immediate movement space or kinesphere of the participant. The therapist's attitude is an active form of *kinaesthetic listening*, during which the therapist stays responsive to the participants' actions without joining into their movement space or movement patterns.

Ad (b): *joint movement – creating sameness*

Therapist joins the participant's movement patterns with the intention to connect with the participant. During this mode the therapist uses mirroring techniques to engage in the movement material of the participant. The therapist attunes to the movement of the participant without expecting kinaesthetic responsiveness. She orients her actions towards a presupposed potential in the participant to have an experience of the "sameness" of the movements, i.e. during the movement engagement in the shared movement space; and towards a presupposed potential to act responsively towards some of the shared movement qualities. It was observed that the therapist kept this orientation towards the moving partner repeatedly and over time, whether or not the participant answered the mirroring interventions.

During joint movement phases the therapist tends to deepen kinetic qualities of the movement patterns once the participant responds intentionally towards the shared movement situation.

Ad (c) – *movement dialogue as relational mode – sharing sameness – sharing otherness*

The therapist uses contingently responsive interventions when mutuality arises. Both, the therapist as well as the participant, adjust to each other's movement patterns. The therapist supports reciprocity towards the shared movement actions through adaptive movement propositions. Movement dialogue may contain sameness of movement material as well as otherness.

They may evolve as playful to and fro actions in which self-other discrimination is clearly achieved. But they also may evolve when the movers differentiate from shared movement themes into individual movement themes without losing the intentional connection with the partner. Within the shared movement space the movers intentionally offer impulses to the movement process of the partner.

Ad (d) – *other relational modes*

All actions of the therapist that were not an intentional intervention oriented towards the participant's movement material were collected under the label other relational modes. This label indicates interventions with another focus than the dyadic movement action.

In the observed material these relational modes appeared in various combinations throughout DMP sessions. The therapist's choices for a specific mode and changes of modes were not predefined. They seemed to be closely connected to her impression of the actual needs of the participant and of the interactional potential of the movement situation. The interventional modes were always chosen with respect to their expected contribution to interpersonal relating. Although this might seem non-applicable to the category of witnessing, it was observed that during those phases when the therapist was witnessing in stillness, some of the participants expanded their activities in space. From the witnessing

position the therapist then could analyse at what point and how she would join the participants in their newly expanded movement space.

5.4.4 Description of the organising theme 'movement actions'

In her movement material the therapist departs from a technical therapeutic discourse to reframe the unfolding interaction with the ASD participant into a dancelike interaction. The therapist's movement actions were closely oriented towards the movement material of the participant. The therapist takes all actions of the participant as potential contribution to the shared movement situation, even at times when the participant is not intentionally engaged with the therapist, which in therapies with ASD participants is the case most of the time during the initial phase of DMP, and which occurs again and again later on in the therapy. The therapist regulates her own movement behaviour such as to stimulate various activities in the participant that will enable a contribution to the dance. Potential actions that may contribute to the shared dance have been defined in Study 1 as *self-initiated* by the participant and as *intentionally directed* from the participant towards the therapist. It was observed during the shared movement improvisations that the therapist responded sensitively to every type of interaction initiated by the ASD participant, but especially that she sought to extend the moments of mutual engagement.

From the observation of the therapist's movement actions it could be taken that, at times when the participant is answering with a SEAM action, the therapist picks up this same action (mirroring or in movement dialogue) and deepens the kinetic qualities of this movement. This deepening can be seen e.g. in enlarging a spatial quality of the movement, accentuating a rhythmical quality of the movement or accentuating the weight quality that is given to a movement action. In this way, not only are all the movement actions of the participant mirrored by the therapist, but also, more importantly, they are further articulated

and pronounced in their kinetic structures. The accentuation of the kinetic texture of the actions by the therapist contributes to an aesthetic structuring of the movement material, similar to structures in dance movements. Examples can be found in enhancing dynamics of a movement pattern – which in turn have an impact on the momentum of the movement process.

Throughout all observations strong resemblances were found in the movement materials of participant and therapist, for the SEAM markers that were described in Study 1. This actually did not come as a surprise, as mirroring was one of the main relational intervention modes. During those phases in which the actions of the therapist and the actions of the ASD participant showed a strong resemblance in the SEAM markers, the therapist could be seen to direct the shared movement material towards an aesthetic deepening. This could be achieved

i) by proposing variations of kinetic qualities of the participant's movement actions or

ii) by offering variations of context for the participant's movement actions.

Ad i) Examples of observed variations in kinetic qualities:

- therapist deepens the spatial quality of the action –e.g. by amplifying the movement, or by offering spatially contrasting or symmetric movements
- therapist deepens the time quality of the action –e.g. by accelerating or decelerating the timing of the action, by synchronisation to the rhythm of the participant or by offering phrases in alternation to those of the participant.

Ad ii) Examples of observed variations of context:

- therapist rephrases the movement materials of the participant – e.g. by lengthening or shortening the movement phrases, or by bringing open phrases to an end;
- therapist repeats actions and sequences;

- therapist presents the movement in a different context, e.g. by performing a movement without prop that originally was performed with prop

Both variations contribute to aligning the actions of the therapist to those of the participant. The participant is offered a movement impression from the moving therapist that is characterised by sameness with regard to her kinaesthetic sensations of her own movement actions. Thus understood, the experience and recognition of sameness within the moving dyad contributes to a decrease of the sensory overload that the ASD participant usually experiences from social stimuli.

By stressing the aesthetic aspects of the movement themes the therapist developed an initial orientation on the participant's *actions* (functional orientation on: *what* do we do/*how* do we move?) towards an orientation on the participant's *perceptions* during action (sensory orientation on: *how* do we experience the movement?).

The image below shows the mutual relatedness of organising themes in therapist's interventions during dyadic DMP with ASD participants: The organising themes were obtained from the open analysis of therapist's actions during DMP in mutual relatedness. The procedural setting serves as a frame of reference or placeholder for the structure of DMP process and session, which in turn serves as a frame for the development of relational variations, and these in turn serve as frame for the movement actions at hand.

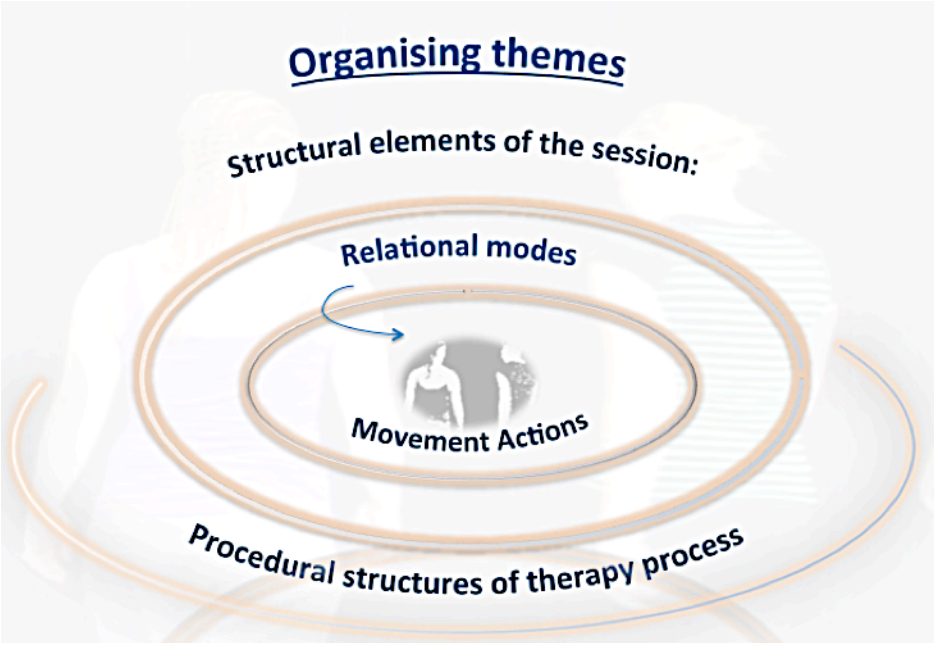


Figure 5: The mutual relatedness of organising themes in therapist's interventions during dyadic DMP with ASD participants

5.4.5 Interrelating the obtained themes: Complexity of DMP structure

The organising themes and the coupled basic actions obtained from analysis of movement interventions of the therapist were then related to the initial reference scenes to determine in which aspects they contributed to intersubjective relating in DMP.

On the level of the procedural structures the shared decision on the therapeutic goals informs and constitutes the working alliance of therapist and client. From the analysis of therapist's journal and session notes it showed, that the mutual agreement of client and therapist to be together in that therapy situation and to work together towards change and improvement, is crucial for the therapist to feel free to one-sidedly approach the participant and seek contact and relating through nonverbal engagement and attunement.

The goals for DMP are usually decided and adduced by parents and caregivers. However, once the participant is referred to DMP these goals are explicitly shared with the client in a

way that they can be understood as a point to refer to during therapy and during outcome evaluation.

The therapeutic process is characterised by an open structure, not knowing ahead how the movement process will evolve, the therapist keeps an open kinaesthetic attentiveness towards the shared movement context and the changes in postural and movement repertoire of the participant. The general structure of the DMP session serves as a ritualised frame for these open-ended structures of movement exploration.

Whereas the organising themes '*procedural structures'* and '*session structure'* have a more indirect impact on the movement processes in the therapeutic dyad, the organising themes '*relational modes'* and '*movement actions'* have a more direct impact on the dyadic relating during DMP. They are directly addressed through and during movement actions, whereas organising principles *'procedural structures'* and *'structure of session'* do not directly influence the nonverbal dyadic movement interaction. However, it should be mentioned that they do have an indirect impact on the therapeutic situation and intervention as they format the therapist's general attitude towards the therapy process.

The movement analysis showed that the actions of the therapist corresponded widely with the SEAM actions of the participants. Due to mirroring activities the content of dance actions of both moving partners show much similarity. However, the therapist's attention and intentional arcs during movement actions were directed towards the client. The kinetic qualities of the actions of the therapist showed more pronunciation, depth and dimension as was to be observed in her use of body, space and effort qualities.

From the observations and the analysis of session notes, it shows, that in the course of the therapy, the therapist tends to shift from the relational modes witnessing and mirroring

towards an increased use of movement dialogue. This was interpreted as a parallel process with the participant's developing SEAM movements. Once the therapist experiences more complexity in the client's use of SEAM and intentional orientating towards the shared movement situation, a contingently responsive relational mode seems to be more appropriate to contain the participant's action. For both movers the relational mode then tends to develop towards movement dialogue in which they are mutually involved.

5.4.6 Testing the obtained themes: Dyadic intervention as reflected with expert movers

The obtained observations of "relational modes" and "movement actions" from the DMP material were compared to the researcher's journal notes on dyadic movement sequences between expert movers, as observed during workshops with DMP students. The researcher kept notes on the expert movers' use of relational modes and their use of movement actions during dyadic movement situations. These observations were used to contrast the researcher's notes on relational modes and movement actions used by the therapist during dyadic DMP with an ASD participant.

In the material with expert movers similar relational features could be identified as from the movement samples from clinical DMP. The pathways of dyadic relating, however, proved to be quite different between expert movers than between ASD participant and therapist. Between expert movers mutual mirroring, adjusting and attuning to the envisaged partner's movement actions was used right from the start to bring about contact. As both movers were equally intentionally oriented towards the other, movement dialogues usually occurred right away once a mutual contact was established. Movers almost always directly answered a movement impulse from one of the partners with a responsive movement action. The

adjustments to the shared movement qualities happened with an immediacy that was even not recognised as a separate action by most movers.

The movement actions that were used by the expert movers to establish and maintain dyadic relating showed strong similarities with the movement material used by the therapist during the dyadic DMP with ASD participants. The movement actions of both settings covered the SEAM markers. In contrast to the therapy setting, the expert movers' use of SEAM engagement showed a high complexity throughout all movement situations. The use of variations in kinetic structures showed very subtle variations, which was considered a consequence of the fact that expert movers already adjusted and attuned to each other's movement material in a naturally synchronising way. As has been shown in Study 1, this has not been the case in participants with ASD.

5.5 Conclusion

The observation of the therapist's movement intervention during dyadic DMP with ASD participants delivered four organising themes: procedural structures of therapy process, structure of session, relational modes and movement actions. Corresponding themes were found in dyadic relating between expert movers. It is proposed that procedural and session structures can be considered to act as holding structure for the therapeutic contact.

Relational modes and movement actions used by the therapist serve the direct intervention in the dyadic relation. By means of LMA based diagnostics and by her kinaesthetic resonance the therapist identifies throughout the therapy process interpersonal movement themes and actions, which are already in the participant's movement repertoire.

While moving the therapist makes proprioceptive predictions about the participant's movement responses. These impressions are the basis for the therapist's propositions to the shared movement situation. This therapeutic attitude can be understood as a form of kinaesthetic listening (Petitmengin-Peugeot, 1999; Samaritter & Payne, 2013).

The therapist's expectancies towards the shared movement situation have a double-faced character. On the one hand they are oriented towards the participant's movement repertoire while at the same time they are oriented towards the therapist's personal movement-answer. This attitude has been described for the context of dance improvisation as the "perceptual process of editing spontaneously in order to make meaning out of any moment" (Nelson, 2006, p. 78).

The organisation of the movement actions in the present moment arises from the movers' spontaneous organisation of movement towards the shared spatial and rhythmic qualities. In this process the movement dynamics between the movers in the therapeutic dyad do not follow a linear structure of input and output or action and reaction. Rather they show a strong resemblance to improvisational dance forms (e.g. Bannon & Sanderson, 2010; Sheets-Johnstone, 1999; Blom & Chaplin, 1988; Tufnell & Crickmay, 1990; Halprin, 2003; Nelson, 2006), bearing in mind, that in dance improvisations all participants adjust to shared movement actions and structures, whereas in DMP the therapist starts off with a one-sided intentionality towards the participant, who is intentionally addressed as a dance partner.

Through mirroring techniques, the DMP therapist offers movement feedback to the participant. This feedback can directly be felt and perceived by the client in the context of the moving dyad. Thus, chains of kinetic experiences are formed that contribute to the self-organisation of the dyadic moving system (Varela et al., 1991; Goudsmit, 1989). The movers

contribute to each other's environment and at the same time they are companions in the shared experience (Noë, 2007). By dancing they give expression to their felt sense, while at the same time their dance is continuously informed by their sensing bodies and by their perception of their environment. In this dynamic interaction circularity arises between a movement and the movement feedback of a partner. It is through this circularity that the movers mutually come to know their own actions from how they are reflected by the partner's actions.

Within the dyadic movement improvisation new action patterns and sequences of nonverbal relating evolve like kinetic melodies (Luria, 1973). In this process the SEAM markers, as formulated in Study 1, may serve as cues for the therapist to act toward shared movement themes. The therapist's action is meant to serve as a reflection on the participant's actions and to support the dyadic closure. This is understood to contribute to on-going perceptive and proprioceptive feedback for the participant. Thus a responsive, self-referential quality evolves in the circularity of kinaesthetic perception and movement action within the dancing dyad. It expresses the shared movement quality, meanwhile informing it. Within this circularity a poetic quality evolves that constitutes the specific characteristics of the moving couple (Barrett, 2000; Shotter, 2010).

In the nonverbal dyadic relation, the therapist acts as a foil for the participant's actions. Through her movement interventions, she builds an expressive container (Payne, 2006) for the actions of the participant to be welcomed to the shared movement situation. This is achieved by mirroring, matching and challenging the social movement behaviours of the ASD participant. The observations showed strong similarities between the therapist's and the participant's SEAM actions. This has been related to the use of mirroring modes by the therapist. Moving with the ASD partner, it is the therapist's expectation about hidden SEAM potentials, her orientation towards the participant's intentionality as well as her responsive

movement actions that define initially the dyadic space and create within the enclosure of the moving dyad an environment of affordance (Gibson, 1977) for the participant's SEAM to evolve.

As in dance improvisations, the therapeutic process is characterised by open-ended movement explorations, with open movement content and structure. The focus of the movers is on the playful investigation of movement possibilities and momentum. The movers' kinaesthetic responsivity towards the shared movement actions gives rise to an improvisational dance form. The perceived immediacy of shared movement qualities between dancers is directly reflected upon by movement impulses (Rouhiainen, 2003; Tufnell & Crickmay, 2004; Paxton, 2003), or as Ribeiro & Fonseca (2011) state "improvisation in dance requires a type of cognition anchored in the body and situated in the relation with the partners and the space" (ibid. p. 72).

Improvisation performers use agreed structures or cues to enable dancers to orient within the complex movement events (Nelson, 2006; Novack, 1990). For the therapeutic intervention in DMP, the SEAM markers identified in Study 1 may serve a similar goal. From an attitude of kinaesthetic listening, the therapist can orient responsively to the ASD participant's SEAM movements. Relational modes and movement actions serve as a kinaesthetic repertoire for capturing and responsively deepening the social facets of the ASD participant's movement actions.

In summary the outcome of Study 2 shows that the movement interventions used by the therapist during developmental dyadic DMP with participants with ASD may be understood as a process of improvisation. The therapist does not know in advance how the movement process will develop. During improvised movement duets the therapist reflects responsively the patient's movement material through witnessing, mirroring and movement dialogue.

During these relational modes the participant is addressed as a co-regulating partner. The responsive movement actions of the therapist intend to develop towards sequences of interrelated movement improvisations between participant and therapist. The therapist's interventions are characterised by an attitude of kinaesthetic partnering; which represents an action orientation towards the participant's (presupposed) potential to engage in and attune to the shared movement material. The therapist pursues to develop the moving dyad from one-sided intentionality of the therapist towards mutual intentionality of therapist and participant in the shared movement domains.

The formerly intuitive DMP intervention with participants with ASD is henceforth proposed Shared Movement Approach (SMA), which is characterised by dance informed structures of improvisation and kinaesthetic partnering.

The image below shows the layered relatedness of organising actions in the Shared Movement Approach to dyadic DMP with ASD participants. The procedural structures and the session structure contribute to a holding framework for the therapy process within which the therapist follows an improvisation-based approach towards mutual kinaesthetic relating in open ended dance structures that are focused on developing the SEAM repertoire of the participant.

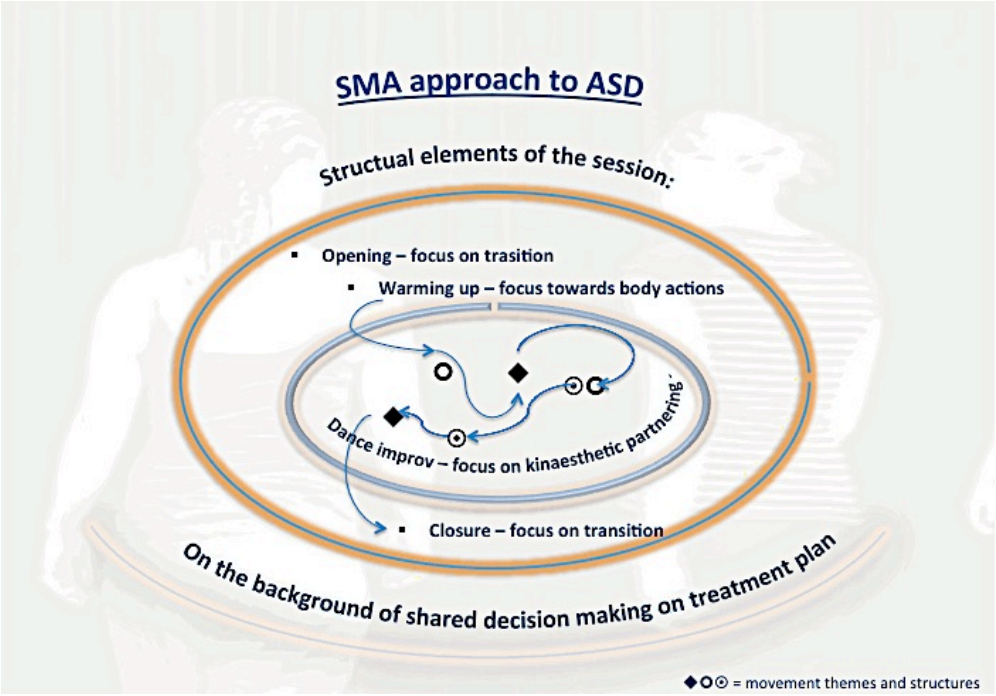


Figure 6: The layered relatedness of organising actions in the Shared Movement Approach to dyadic DMP with ASD participants

Table 4: Research steps taken from open coding analysis of therapist's interventions during DMP with ASD participants

Open coding:	Retrospective analysis of DMP intervention with young participants with ASD as taken from video samples of clinical DMP			
	⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩			
Organising themes:	Procedural structures of therapy process	Structure of session	Relational modes	Movement actions
	Examples of annotations:	Examples of annotations:	Examples of annotations:	Examples of annotations:
Basic actions:	– treatment planning – goals – evaluations – reflections on process – not knowing beforehand how theme will unfold – kinaesthetically informed decision-making – movement observation/diagnostics – the environment (space) shapes the movement	– opening – warming up – structured games and movement activities – improvised movement activities – unfolding movement themes – closure	– therapist joins into movement patterns of the child – immediacy – therapist moves in shared movement with the child – contingently responsive – movement dialogue – still/not responsive to child's actions – mirroring actions of the child – exaggerating actions of the child – follows participant's initiative – shapes movement experiences through own movement (environment)	– organizes movement towards participant – Observes – Kinaesthetic awareness – Kinaesthetic responsiveness – Spontaneous response; – direct responsiveness – repetition of patterns – sensing and expressing – kinetic chains/sequences (organize body and movement process) – embodies verbal content – repeats movement patterns – contrasts movement patterns – synchronizes to rhythmic patterns of the participant. – verbalization of movement actions – accompanies movement with voice/breath
	⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩			
Interrelating of the themes:	Procedural and structural holding/embedding of therapy process		Complexity of intervention mode and movement material	
			⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩	
Testing the themes:	Workshop with expert movers/DMP's to test for the complexity of intervention mode movement material			
	⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩			
Interrelating the explanatory models:	Hermeneutic activity: contrasting video-material workshop vs. DMP; relating this to dance related theoretical concepts Kinaesthetic partnering – dance improvisation – affordANCE of SEAM action potentials			
	⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩ ⇩			
Theory:	DMP intervention described as SHARED MOVEMENT APPROACH (SMA)			

Chapter 6

Kinaesthetic ways of knowing: Reflections on the research path

"…think through the body and not along the outside of it…"
Mable Eslworth Todd, 1937, p.177)

6.1 Introduction

The aim of this chapter is to document reflections on the research process that took place throughout the various phases of the project.

This research project had its origin in the clinical experiences of the author. I found myself wondering how it was possible that participants, who were diagnosed with ASD and who were said not to be able to connect or to mutually engage, were found developing a sense of regulation in their interpersonal encounters. The sensitive changes within the moving therapeutic dyad seemed to be paralleled by parents' reports and participants' reports on how they experienced the changes in interpersonal relating throughout therapy, which were in contrast to the regular pathologizing views on autism. How could that be? What happened in the dance therapeutic context so that the pathological traits were less important predictors of a participant's improvement options than were the personal differences in dance patterns and

characters? This first wondering of how these emerging capacities could be understood, is what gave momentum to the present research.

6.2 Reflections on the research process

When I started this project I felt that I held quite some clinical knowledge on how moving dyads develop within DMP. A mixture of knowing my professional field and wonder about the specific processes that took place in DMP with autistic participants characterised my point of departure for this research journey.

The challenge was to bring this incorporated knowledge, this "savoir de familiarité" (Merleau-Ponty, 1962, p. 186) into the declarative structures of academic research formats.

The act of reflecting is usually understood as a mental or cognitive action or process. We ask "what did you learn" and we expect the reflecting mind to turn back upon itself; self-examination then leads to sense-making, that is articulated in understanding, formulated in structures that represent this process of understanding (Cohen & Crabtree, 2006)

Likewise, in terms of movement, reflexivity can be understood as an active approach towards the own body and movement. By attentively following our kinaesthetic experiences we learn about our experiential specifics, we (e-)mind our bodily experiences (Samaritter, 2008). This reflexive state corresponds with what Milner (1969) called the "body-mind-state of being" which is the direct sensory internal awareness of the (moving) body in the present moment. Understanding is not articulated here in terms of representations of the object considered,

but rather in experiential terms, of a type of knowing that evolves from the dynamics of the system (Fogel, 2011; Seaman & Rheingold, 2013; Shotter, 2011).

The necessity to explain my doings as a DMP has been present throughout my professional career. The wish to make a clear contribution to a multidisciplinary psychiatric team or to mental health guideline committees on what DMP is about and can do, or even better to show which type of changes do happen throughout DMP, was another strong initial motivation for this project.

This chapter will show the implications of these points for the research and how they informed my research practice.

6.3 Tacit Knowledge articulated and expressed

The challenge throughout the research process has been to explicate the tacit knowledge of the DMP practitioner (Polanyi, 1969; Sheets-Johnstone, 1999; Fuchs, 2001; Parviaanen, 2002). Tacit knowledge was originally defined by Polyanyi (1958) as a type of knowledge that resides in our actions rather than in our explicit articulations.

The embodied knowledge or how DMP works in relation with autistic participants was indeed something I was carrying with me. It was something so clear to me, that I thought it should be easy to make it explicit, to study the specifics.

But right from the first papers I had to produce for applications and formal assessments of the project I found that my words were bound to specific experiential qualities. Suddenly it

seemed a difficult task to transport my thoughts to readers who did not share the initial experience or who had no frame of reference for processes as they develop in DMP.

This was an discomforting discovery as it brought me back to the very beginnings in my initial training as a Rhythmics teacher, and the very beginnings of my DMP training, when an explication of processes within the domain of movement was often simply not given, but instead these processes were said to be unexplainable. One had to experience them, we were told, in order to understand. I've always felt an internal rebellion against these allegations; they challenged my wish to be able to verbally articulate and to be able to verbally share these experiences with people who had not been present or who came from other frames of reference.

Hence, an important part of my learning throughout this research was about finding the wording for processes in a domain that in its very nature is intersubjective.

It seemed to me that in order to achieve this task, it would not be sufficient to just describe and analyse the processes in DMP in an objectifying way, looking from the outside. Instead, it would be necessary to find a vocabulary that covered the knowledge from within the experience of the movement situation and from the knowing body (Shotter, 2011). To word experiences from within, I thought it might help to find the external traces that the movements had left or created. An external source for the reflection on the processes at hand could serve as a (stable) point of reference.

Figure 7: movement traces

Like a glove, worn for many years, holds the information of the experiences of their owner's hand, the shoes of the dancer hold the traces of their owner's movements, a drawing might hold the information of the movement that created the very drawing, words may hold the experience as well. They can be considered a condensation from the experiential context, in that they represent an external trace of our (moving) experiences (Wittgenstein, 1945/1971; Gibbs, 2003; Gallagher & Hutto, 2008; Noë, 2007). We could look at and reflect upon these experiential containers and by doing so make sense of our experiences and develop an embodied mind.

My research journal notes consisted of written and spoken text, and of sketched drawings of the reflective movements of my mind and of the (marked) movements that I used to trace back what I had experienced in the therapy sessions or in sessions with the movement analysts. Through my doing so I found the experiential traces to my research subject. This route to reflexivity is to be considered an enactive approach to sense-making (Froese & Di Paolo, 2011).

From these experiential reflections I learned that movements also leave a trace in the other mover, the partner. All participants I worked with left traces in my kinaesthetic/body memory about their specific ways of relating and I could reconnect with them through attentive reflective kinaesthetic listening (Morrissey, 2008).

From what has been said thus far two forms of reflexivity can be discerned:

- Being in the moment: looking and thinking with a dancer's mind
- Looking at the traces of movement processes: wording from the experiential body.

I learned that both forms of reflexivity were necessary to conduct this research and to help me to find a vocabulary for the primary embodied experiences.

6.4 Kinaesthetic Lenses

Reflection can also be considered "an examination of the filters and lenses through which you see the world" (Mansfield, 2006). The structures of grounded theory methodology (Glaser, 1992) have been a guiding principle for Studies 1 and 2. The aim was to look at the processes of DMP with ASD participants and to approach them with a research format that facilitates a conceptual openness towards the experiential phenomena, rather than with predefined theoretical concepts. In the course of Study 1 I developed the SEAM markers as behavioural criteria to articulate and to recognise the events of DMP that were relevant for the interpersonal engagement behaviours of the participants. It became more and more obvious to me that they could be used as a lens that could support my wording of what I was experiencing as a therapist. This wording was still very close to the primary embodied experiences.

The wording found in Study 2 helped me to make a conceptual framework for my actions in the shared movement situations. It also enabled a link between the outcome of DMP processes and other domains. I found my lenses to be profoundly informed by my experiences as a dancer – and indeed it was in the literature on dance that I found a lot of

cross-connections with the concepts on DMP intervention that I had formulated in Study 2, as I also found in the literature on (jazz and dance) improvisation.

Throughout my research path I developed towards a kinaesthetically informed excentric position. The obtained experiential categories were calibrated with other observers and this deepened and added to my understanding of movement analysis.

I had expected the movement observations for this project, would be an easy thing to do. Indeed, all analysts were trained in movement observation. But then during the preparatory meetings I found that what was quite obvious to me, who had participated in the therapy, was not so obvious to the movement analysts who had not participated in the movement experience. Only after they had been able to add the experiential dimension to it, the initial movement categories came to make sense to them. Thus this type of observation had a kinaesthetic quality to it. I learned that the observer's own experience of certain movement material informed her ability to recognise the very movements in another mover. These concepts offered connections to research on the inter-connection of movement action and movement observation within and between movers (Calvo Merino, 2006; Hurley, 2006). In the context of movement observation, as in the context of neuroscience, the condensation of observational data into the abstraction of scales or profiles still needs a linkage to direct experience.

6.5 Ongoing kinaesthetic reflexivity

The research activity contributed directly to my therapy work. My own research interests brought a reflexive participatory dimension that was present throughout therapies. There was

an ongoing stream of kinaesthetic perceptions that informed my reflections on the actual processes of moving and of experiencing the intersubjective interactions as they occurred. My understanding of these reflections shifted from an *embodied* understanding towards a *kinaesthetic* understanding. That is, the former expresses the perceiving mind, more passively, as situated in bodily reception processes, whereas the latter presents the perceiving mind, more actively, as a bodily process of sense making. I call this real-time reflexivity the 'kinaesthetic way of knowing' (Samaritter, 2014).

Looking back I realise that it was this kinaesthetic reflexivity that formed the lenses for my first observations during the open coding procedures and for the analysis and the synthesis of the results throughout the project.

The grounded theory approach that has been applied at certain stages of the research demands a continuous reflection that moves on until a saturation of concepts has been achieved, leading to testing, calibrating and validating these very concepts. Even during the process of writing this continuous reflection took place. What I put on paper reflected back to me and formed the starting point for new hermeneutic activity.

The writing of this thesis thus contained at once both a process and the condensation of that process, as a still frame of a movement sequence carries the information about the momentum which is not experienced in it, but which might be deduced from it.

I found that what I called the kinaesthetic way of knowing enabled me to integrate the reflexive processes at various levels. Kinaesthetic knowing to me means that the bodily felt content not only has an implicit quality (as has been discussed e.g. as concept of "tacit knowledge") but rather that it bears an explicit quality, because the awareness is with the movement *action,* with the potential to articulate and regulate the expressed action.

This type of reflexivity was also observed in the participants in this study. After a movement activity that had a very relaxing effect, one of the adolescents came up with a research plan to investigate what would be the effects of relaxation versus movement exercises on the concentration capacities to children with ASD, because he found that he could concentrate much better after having found relaxation through movement.

Another example of this type of reflexivity was found during a meeting with the movement analysts, when one of the participants was struggling to recognise one of the observational categories. When the verbal explanation did not help to clarify, I offered a movement experience, which indeed gave more insight in the specific category. When afterwards I offered to write down what we had agreed upon in movement, she told me that this was not necessary for her having experienced the specific quality in her own body was sufficient to remember she said.

The following series photographs show how kinaesthetic reflexivity is directed within subject towards the experience of the own body and movement and at the same time towards the shared movement context.
The movement actions are regulated through information from both circuits.

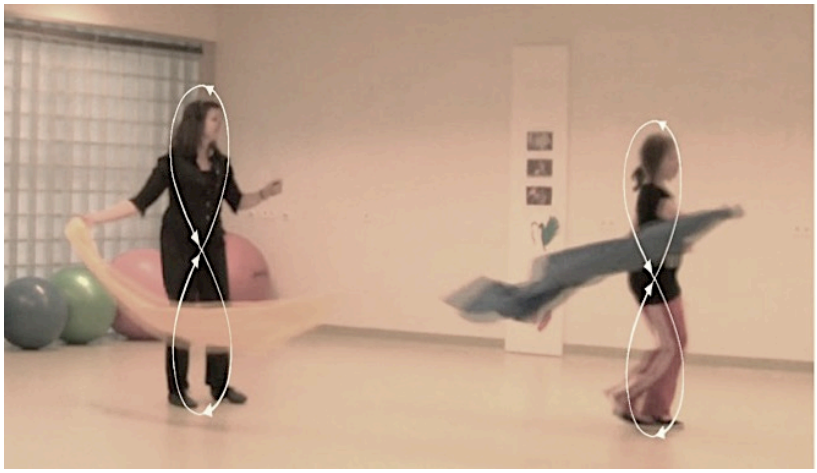


Figure 8: Kinaesthetic self perception occurs within subject

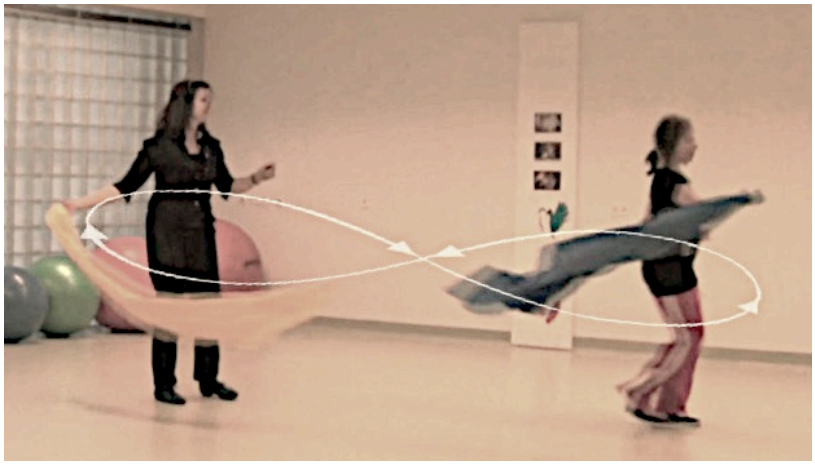


Figure 9: Kinaesthetic perception of others occurs between partners

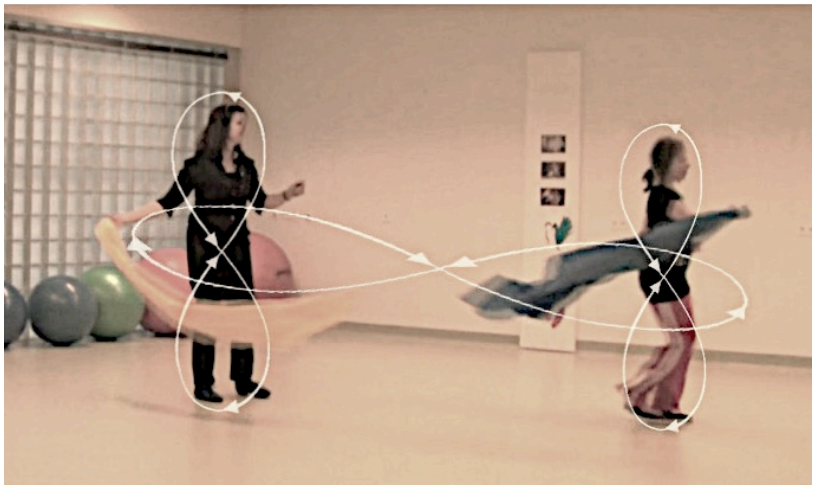


Figure 10: During kinaesthetic partnering self other perception occur simultaneously

6.6 A personal account

Personally, I found in moving and dancing an embodied account to reflect on my research processes throughout my PhD. The current practice "dance your PhD" speaks to me in that it crosses the bridge from the other side: coming from cognitive studies towards embodied practice. Unfortunately, the dance too often serves more as an illustration of the cognitive content than as a genuine reflexive contribution.

Throughout my research I used movement and drawing as forms of journaling next to my written and spoken notes. The dance movements were here approached as collector's items: collecting the movement traces that others left in my kinaesthetic memory, condensing the movements into drawings and sounds, collecting dance movements that I felt addressed by. These formed the basis for a continuous hermeneutic activity, self-related and self-other related, throughout the entire research process.

Sharing with others in dance and sharing with others in academic practice was an essential activity to keep up a reflexive attitude. The many conversations in my research discussion groups about research structures and the struggles to find the right research formats were important learning experiences. Presenting ideas and concepts, but also searching for the right decisions on measurement tools, sharing ideas with others by means of presentations – all these activities formed a challenge, but at the same time they were helpful to put my thoughts into structures and words that others could recognise as academic practice and on which they could reflect in their turn.

The reflective feedback of participants in this research sometimes touched me deeply and left me grateful for their companionship on this journey.

In a follow-up session a girl with ASD reported that she was having less clashes with other people now – especially her sister. When I asked her if dancing during therapy had helped her in this respect she replied:

"… hmmm yes…for example when I see a person, then…then I have suddenly in my head a dance (of that person) – then I can understand what the person is feeling … yes, that is much easier now than before. Before, I could not bear emotions so well, now I can handle them much better."

6.7 Professional roles

How to influence the structure of oysters

The start of my research within the constraints of a (non-academic) hospital also implied the necessity to find a place for the new activity within the demarcations of my professional space. A shift in professional identity was coming together with newly assumed roles.
As a part-time PhD student I experienced this throughout my research journey at several moments.

Morphogenesis might serve as an example here for the mutual influences of roles throughout the process: Like in the oyster the intruded sand leads to specific patterns of growth, in which the sand is incorporated, the researcher is part of the context that is being investigated, and thus a part of the resulting processes.

Throughout the research process the clinical work of DMP was continued. Continuous switches in professional role and identity characterised the ongoing practice.

Shifts from the role of practitioner to the role of practitioner-researcher (Payne, 1993) had implications, both at a personal level and at the institutional level.

DMP's in the Netherlands usually do not come from an academic background. In the multidisciplinary team at the clinic a new balance was developing between practice orientation and research interest. At times it alienated me somewhat from my DMP colleagues and shifted my position in the team, whereas academic colleagues showed more interest in my work once they heard that I was on a PhD trajectory. Invitations for research meetings enabled me to contribute from a dance and experientially informed perspective on academic research.

The research attitude did change my therapeutic attitude. As a practitioner I felt that being in the research process didn't stop once I walked into the therapy space. I found that I could also invite participants into a researcher's attitude towards their own personal processes. To my impression this contributed deeply to a more participatory perspective in the therapeutic as well as in the research process. It also had an emancipatory effect in that it helped me to address the participant as a co-researcher on his or her own process. This side effect of being a therapist-researcher was completely unforeseen, but it contributed profoundly to a new identity as a therapist and it challenged my thoughts about participatory forms of research yet to come. Therapy looked upon as a shared research of therapist and participant into the elements that contribute to (more) well-being and emotional and social balance supported me as a therapist to ask different questions, to allow myself to leave the position of the "knowing therapist" and put forward questions from a genuinely naive position of not knowing.

As a researcher I had to regulate and to coordinate processes that involved a diversity of stakeholders, like hospital staff, medical ethical board, administrators, funding organisations,

the UH supervisory team, therapy participants. This was at times a demanding task – the coordination of all the lines involved more than once drove me to the edge of what I felt I could achieve. For me personally this maybe was the biggest challenge: to become a conductor (of research) instead of an orchestra member (in hospital setting). And yet here is the paradox: the practitioner – researcher is conductor and orchestra member at the same time.

Institutional developments have also been of strong influence on the course of this research. Due to changes in the institute's organisation and its policies a different patient population came into mental health care. The hospital's funding policies changed in the course of the project. Both aspects contributed to changes that made it impossible to follow the original plan for my research, which resulted in a changed research plan after the second viva.

The diminished admission of potential participants in the institute's care system left me with doubts about the feasibility of my research within the given context. Recurring doubts on whether or not to move on with a small number of participants challenged my thinking on the contribution this research should deliver and on how a relatively small professional group like DMP can contribute to document the professional impact on a specific population. However my doubts, I hope with this explorative study I delivered a format that might be useful for the design of replicable N=1 studies that together may contribute to empirical evidence on DMP practice. Comparable formats have been proposed for research in the clinical setting (e.g. Bartels, Spreen, Schuringa & Teeke, 2008). Maybe the small scale of this research is its weakness; however its embedment in the natural setting is its strength. I learned that it directly contributed to a reflective practice and outcome evaluation, the latter being very much in line with the Dutch mental health care policies on outcome monitoring.

I hope this knowledge will help to prepare, along with the formats found appropriate for research in the natural setting of therapy, a new ground to build on and to continue our research contribution to the DMP field.

keep dancing for better, for change

Chapter 7

Study 3: Experiential calibration of movement analysis: towards embodied ways of observing

"…to see…is not only to see something….but also to see from somewhere…."
(Shaun Gallagher, 1995, p. 234)

7.1 Introduction

This chapter will explore the applicability of the SEAM observation scale for movement analysis of interpersonal relating behaviours, when used by multiple raters. As has been shown in the first research step of this project, the SEAM scale has been developed through (retrospective) content analysis of clinical DMP with ASD participants. This chapter will investigate if movement analysts with divergent backgrounds recognise the content of the SEAM observation categories during movement observation when using it for the annotation of video samples of dyadic DMP with participants with ASD. Suitable annotation procedures for the SEAM observation scale will be investigated.

7.2 To see interpersonal movement behaviours

Movement analysis in DMP research typically serves a twofold aim: i) it supports therapy outcome monitoring and ii) it is used to capture and evaluate movement specific content in intervention studies.

Movement analysis has been used in several research studies on DMP interventions (Koch, Glawe & Holt, 2011). The most commonly used systems like Laban Movement Analysis, LMA (Bartenief & Lewis, 1980/2002) and the Kestenberg Movement Profile, KMP (Kestenberg-Amighi, et al., 1999) seek to capture the specific movement characteristics of the individual participant. All observed actions are taken into account and described in a movement profile that summarises the movements used by that specific person in that specific context. A few inventories map specific movement domains, like for example the movement scale for the observation of movement behaviour in children with autism of the Behavior Rating Instrument for Autistic Children, BRIAC (Kalish, 1976) and the systemic variant of the Movement Psychodiagnostic Inventory, MPI (Davis, et al., 2007; Dulicai, 1977), which assesses the interactions between family members.

With the growing need for evidence based practice, researchers have become more interested in domain specific evaluation tools (Meekums, 2010). Studies into the validation of movement specific evaluation tools are a good starting point to develop robustness of structured movement observation (Gass, Kennedy, Hastie & Wentworth, 2012; Gross, Crane & Frederickson, 2010; Koch, Cruz & Goodill, 2001).

The SEAM observation scale has been developed from an experiential perspective on the dyadic interaction between DMP therapist and ASD participant. The therapist's own experience of the child's interpersonal relating behaviours within the dynamic system of the

moving dyad was taken as an indicator of significant moments in the kinaesthetic interaction. The SEAM observation categories are focused on the movement actions that the participant initiates and intentionally directs towards the shared movement situation. In contrast to other movement analysis tools, the SEAM observation scale does not take into account the general movement profile of the participant. The SEAM categories represent a specification of movement behaviours within the child's repertoire, which do not presuppose any specific movement skills. Due to this perspective, the movement behaviours of the ASD participant are not approached from putative ASD specific movement features (Bhat, Landa & Galloway, 2011).

This research step forms the transition from the therapist's experientially informed perspective towards a perspective of movement observers whose way of seeing has not been informed by the experiences within the therapeutic dyad.

For the generalisability of the content of the SEAM observation scale it would be crucial that other movement observers can identify the same movement categories from observations of dyadic, shared movement situations between therapist and participant. It would also be important to investigate whether the outcome of multiple raters' observations generate comparable profiles to those of the therapist's own observations.

If a convergence can be found between movement analysis delivered by the therapist, which had been experientially informed through the participation in the dancing dyad, and the movement analysis by external not experientially informed movement raters, then this would contribute to the content validity of the SEAM observation scale.

The initial questions for this third research step have been formulated as follows:

- Do multiple raters recognise the contents of movement categories of the SEAM observation scale during the observation of interpersonal movement behaviours during dyadic DMP?
- Do the movement categories that have been defined for the SEAM observation scale lead to reliable agreement between multiple raters' annotations of interpersonal movement actions during DMP?

7.3 Methodological considerations for multi-rater movement observation studies

Movement analysis has been used in research on DM'P in two ways:

i) Direct observation during action, where the observer is present in the movement situation itself or behind a screen.

ii) Movement analysis taken from video samples, either unstructured samples from a natural situation, such as a DMP session, or structured samples, e.g. vignettes selected for specific criteria from a previously recorded DMP session.

Movement observations may be performed with *sequential analysis* (Bakeman & Quera, 2011), where every action is annotated in terms of start, duration and ending. This type of observation is for example applied in the Kestenberg Movement Profile, KMP (Kestenberg-Amighi et al., 1996). Another type of analysis is that of *interval notation*, where within a set time frame actions are evaluated as present or not present. This type of annotation is for example applied in the Movement Psychodiagnostic Inventory, MPI (Davis, Lausberg, Flaum, Berger & Dulicai, 2007).

Any movement analysis procedure needs to define observables. For this research the observables are the movement markers that have been described and defined in the SEAM observation scale during the first research step (Study 1). In order to develop annotations that are replicable and comparable between multiple users it would be necessary to systematically describe the procedures to be used in the observations. The type of coding will also determine the type of data collected with the observation tool. For instance, the presence of a particular movement marker, or its frequency or duration within a particular sequence, can be used as annotation criteria that deliver quantitative data regarding the presence of this movement marker. The calculation and analysis of data from multiple raters' annotations heavily depends on the type of data produced by the observation tool.

The use of pre defined observation categories decomposes the movement process, that is otherwise considered a holistic entity, into parts. To reduce the impact of this fragmentation, observers have to achieve a perceptual distinction of the single categories, without losing the kinaesthetic context of the movements observed. Another aspect relevant for movement observation is the impact that the observers' own movement experiences and preferences may have on the movement annotations (Lausberg, 2013; Cruz & Feder, 2013). For dancers it has been shown that their perception of movements is filtered by their personal movement experience and repertoire (Calvo-Merino, Grezes, Glaser, Passingham & Haggard, 2006). Preparatory training in the movement material to be observed and for the application of the correct categories on the observed movement material is supposed to enable the movement analysts to develop mutually shared perceptions of the movement markers at hand. This is supposed to help to minimise bias due to personal movement preferences (Koch et al., 2001). Training procedures for the KMP and MPI for example offer movement experiences to prepare for experientially informed movement observation. Likewise, in this study the

participating movement analysts were introduced to the SEAM observation scale during preparatory training sessions before it was used for the study of interrater agreement.

They were invited into movement experiences that specifically covered the SEAM movement repertoire as a part of the learning process to acquire a bodily felt orientation on the observation categories.

The clinical context forms the natural environment of the therapies that were subject of this research. The research approach should be equipped to match the natural situation (Pink, 2011). For the purpose of movement observation during DMP, video recordings may be considered natural data, as understood by Knoblauch et al. (2009). They state that if "…the recordings are made in situations affected as little as possible by the researchers … natural data refers to data collected when the people studied act, behave and go about their business as they would if there were no social scientists observing or taping them." (ibid., p. 11).

Bringing a video camera to the DMP situation does of course have some impact on participants and therapist. Experienced authors agree that in most cases the effect of the camera becomes neglectible, as participants tend to get used to the presence of a camera after some time of habituation (Knoblauch et al., 2009; Cruz & Koch, 2004). However, the place of a camera in a movement situation has to be considered carefully. For the studies at hand a digital camera was positioned in a safe place that did not hinder free movement action or play with props. Through the use of a wide-angle lens most of the movement space was covered for recording.

Video recordings deliver a vast amount of data. The organisation of these materials requires technical considerations, such as decisions on file formats and editing software programs, as well as ethical considerations regarding safe data storage (Denzin & Lincoln, 2000).

For movement observations to be based on video vignettes, the material has to provide the observers with a good view on the actions of interest. For this research the recorded material was scanned according to the criterion of *interaction order* (Goffman, 1982), which means that only those sequences were selected for observation, where participant and therapist were both present and visible in the scene.

Methods of movement observation are too often based on non-standardised qualitative measures, or they depend on the observation and annotation skills of movement analysts, so that their interpretative character becomes a source of unknown variation. Therefore, when testing the applicability of a movement scale for a certain domain of interest, issues of interrater agreement and within rater consistency need to be addressed (Tinsley & Weiss, 2000; Koch, 2007; Cruz & Feder, 2013; Lausberg, 2013). The current research step is meant to address these issues.

7.4 Research step 3: calibrating the observer's eye

The purpose of this research step was to examine the usefulness of the content of the SEAM markers in terms of agreement between multiple raters. The validity of newly developed observation scales has been widely discussed in the literature (Milberg, 1977; Feder & Feder, 1998; Mayring, 2000; Cruz & Koch, 2004; Yin, 2003; Krippendorff, 2004; Hartley, 2004; Gross, Crane & Frederickson, 2010; Cruz & Feder, 2013).

For the purpose of this research step the interrater agreement is of specific interest in a twofold way. Agreement between multiple observers on which interpersonal behaviours are

covered by the SEAM movement markers might be considered as an indicator for the validity of the content of the proposed SEAM markers. And secondly, agreement between multiple observers on the assignment of a particular movement marker to an observed interpersonal movement behaviour, would show that the SEAM categories are defined well enough to be operationalised for the annotation of interpersonal movement behaviours. Agreement between movement raters would support the validity of the construct of the SEAM observation categories for use by multiple raters who did not participate in the observed situation. (Cruz & Koch, 2004; Trochim, 2006; McLeod, 2007; Cruz & Feder, 2013). Therefore, the interrater agreements are investigated here not so much in order to estimate the reliability of the SEAM markers, as in order to assess their validity.

7.4.1 The annotation procedure (data collection)

To find out which type of procedure would fit best with the SEAM observation scale, two different coding procedures were tested with multiple raters: i) a sequential annotation procedure and ii) an interval annotation procedure (Bakeman & Quera, 2011). During the sequential procedure (i) the movement analysts annotated video vignettes for the frequency and duration of SEAM behaviours. During the interval procedure (ii) the movement analysts indicated whether SEAM behaviour was present or not during a specified time segment.

Participants in this study were qualified movement analysts who were recruited through DMP's professional networks in the Netherlands. All raters had already followed specific training in Laban based movement analysis, as part of their background in dance movement therapy or psychology. Some raters were acquainted with computational movement annotation procedures. During the selection procedure rater candidates were offered an introduction to the project and a first introduction to movement analysis with the SEAM observation scale. From this group three raters decided to participate in the interrater study.

At a later stage one rater left the project. After a second recruitment round three additional raters could be included. Thus, in addition to the researcher five raters participated in this study. Throughout the study raters were organised into couples to compare outcome of movement annotations.

Process structure of interrater training and annotation with SEAM observation scale:	
Inclusion of raters ↓	• Information about the project • informed consent • privacy statement
Rater training (1) in SEAM ↓	• manualised rating/coding procedures • movement based training to develop towards experientially shared understanding of SEAM categories
Rater training (2) in SEAM ↓	• with ELAN annotation tool with SEAM template or • with SEAM coding sheet
Annotation trials ↓	• with ELAN annotation tool with SEAM template or • with SEAM coding sheet
Rater training (3) in SEAM ↓	• interrater agreement & disagreement addressed • critical review of manualised rating/coding procedures
Raters' individual annotations	• with SEAM template in ELAN (point-to-point-annotation) or • analysis with SEAM coding sheet (sinterval annotation at set time-points)

Table 5: Flow chart of interrater training and annotations

Throughout the individual rating process online (technical) support and peer support was offered. Raters were invited to keep notes on their rating experience in an annotator's comment sheet. The researcher kept session notes on the training procedures and comments on manual, movement categories and technical issues during the training meetings and feedback sessions.

During interrater training the raters were introduced to the SEAM categories by means of a series of video samples taken from movement therapy situations that were quite similar to

the situations that had to be annotated later on. All movement categories were discussed by means of these samples.

As the SEAM is a tool derived from practice-based contents, raters were guided through movement experiences for each SEAM category. Raters were invited to share their view on the matches between movement action and movement observation category. On the category 'weight' there were several adjustments and clarifications added after the raters' comments. All other categories seemed sufficiently defined already in the first version of the manual. For a movement behaviour to be rated in a particular movement category, it had to meet these criteria: i) it was initiated by the participant and ii) it was directed towards the therapist or towards the shared movement situation.

Video samples of clinical sessions of dyadic DMP with ASD adolescents served as natural data for the movement analysis. All video materials were handled according the medical ethical procedures appointed to this project. Participants in the therapy and their parents as well as the movement raters signed for informed consent.

From the session recordings the researcher selected vignettes of 45 seconds duration for movement analysis. Rank numbers of selected sessions had been set beforehand, so that for all cases there was a similar selection of time points over the therapy process. Video samples of the selected therapy sessions were taken from moments that had an open, not pre-defined interaction structure. All samples were taken from a section when the DMP intervention was conducted in a contingently responsive intervention mode.

Samples of vignettes of each participant were arranged in randomised series that did not convey any information about the treatment stage. Then these series were randomly assigned to the movement raters, so that all raters would see vignettes of an equal number of

participants. Diagnosis and progression of treatment of the DMP participants was not unveiled to the annotators. All materials were presented with anonymised codes. An online program for the generation of random sequences[5] has been used.

In the movement raters' training sessions the raters were introduced to the annotation procedures, to the definition of coding scales, and to the storage of annotations through verbal instructions and through the *Movement Annotators' Manual*, which had been written by the researcher (Appendix no 12) and which served as a guide for raters throughout this study. The manual provided a step-by-step specification of the usage of the annotation software in general and of the actions specifically to be taken by the raters when coding the SEAM categories. It contained the definitions for the individual SEAM categories, and for the overarching themes of engagement and regulation in space, weight and time.

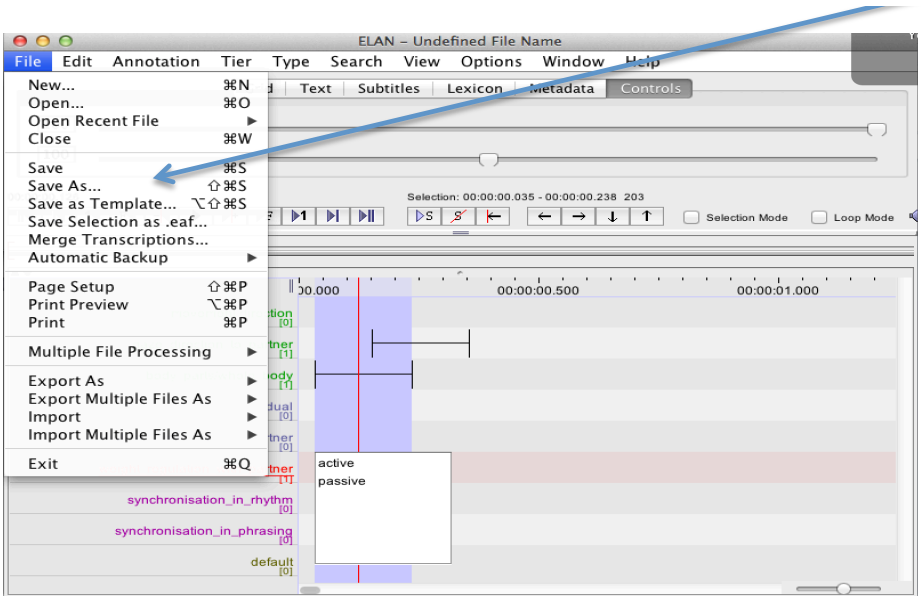


Figure 11: Example of guidance through annotation software as offered in the raters' manual

[5] Retrieved from: www.random.org

Qualitative data were collected by means of comment sheets that raters kept throughout the rating process and by evaluation forms that raters completed after the annotation process. The researcher kept field notes on the training sessions and these were also analysed for comments on annotation procedures, training manual and clarity of SEAM categories.

Quantitative data were collected from the annotations with the SEAM observation scale. The results of two different annotation procedures were compared for interrater agreement.

For the first annotation procedure, the ELAN annotation tool, version 4.6.2, was used for moment-to-moment sequential movement annotations. The software was obtained from the website of the Max Planck Institute of Nijmegen[6]. Movement raters were trained in the use of the software tool during their introductory training sessions. They received the ELAN users' guide for personal use and were introduced to the program's inbuilt help function.

The SEAM categories were put into a template that made it possible to use the SEAM observation categories within the software program.
All actions to be taken by the raters were described in the manual that was produced for this study. The manual also provided the raters with the definition of the SEAM categories as well as a step-by-step guide for the specific rating procedure.

[6] Retrieved from https://tla.mpi.nl/tools/tla-tools.

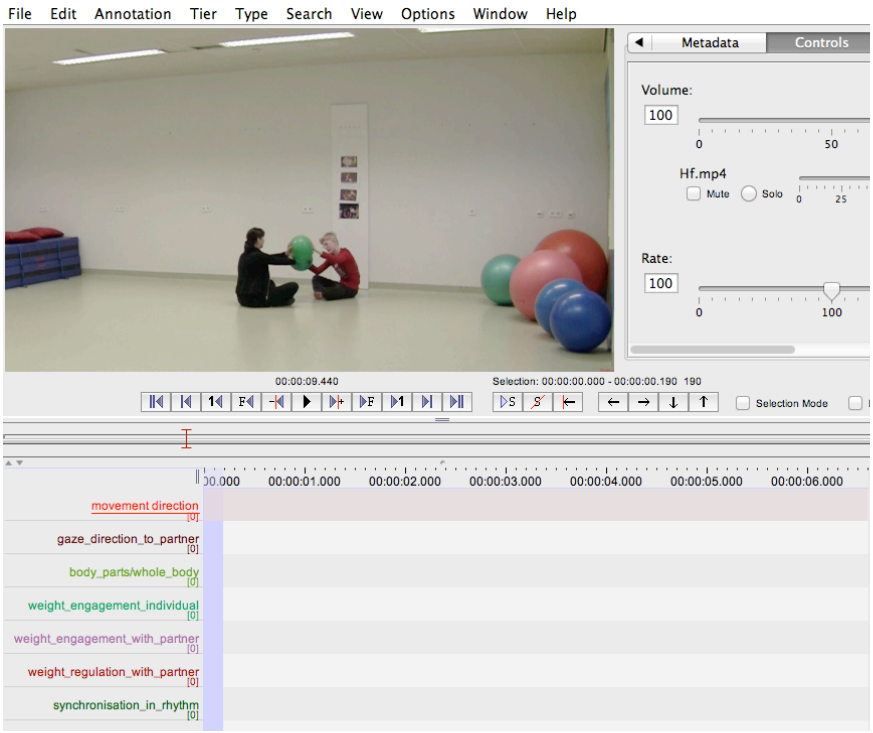


Figure 12: Example of SEAM annotation template in ELAN

The second annotation procedure covered interval annotations with the SEAM observation scale. The movement categories were rated as present or not within a given time interval. This yielded data on the presence of each movement marker for each vignette. The listed items were edited as a SEAM coding sheet in Excel Fig. 13). Raters indicated the categories present during a set time frame with x. The coding sheet was suitable for annotation by hand or annotation on a tablet or computer. The annotator watched the video file on the screen and indicated the movement categories that were present during the passed time frame.

MOVA IV obs. sheet/move. Categories/ SEAM											
please indicate with "x" if the movement marker was present in the video vignette											
annotator											
file name:	A1		B1		C1		D1				
movement direction							v				
facial orientation	x				v						
body/body part direction	x		x		v						
weight engage. individual	x										
weight engag. partner			x				v				
weight regul. partner					v		v				
sync rhtythm					v						
sync phrase											

Figure 13: Example of SEAM coding sheet in Excel

For the annotation procedures with ELAN there were 24 video vignettes of 45 seconds each. Four raters were combined into six pairs, and each pair of raters was given a different set of four fragments, so that each rater was shown a series of twelve vignettes. For the annotation procedure with the SEAM observation scale two raters coded all 24 files.

7.4.2 Data analysis

Statistical analysis of quantitative data was calculated within ELAN and with SPSS. ELAN software offers statistical functions on a number of summative calculations, accounting for the type of annotation, the number of annotations and the duration of annotations. The movement category that was considered present in a certain time frame was of primary interest for the purpose of this study.

Interrater agreement was calculated for both rating procedures by means of Cohens's kappa. Raters' comments, their evaluation forms and the researcher's own session notes were analysed with contents analysis, focussing on 'comments on movement categories', 'comments on instruction', 'comments on technical issues' and 'evaluation of training procedures'.

7.5 Findings

7.5.1 Outcome of the preparatory vignettes

After the second training session the movement raters completed a series of eight observations as a preparation to the annotation procedures. The agreed and disagreed annotations were discussed in the rater group. In a first step it was discussed whether or not the movement observers felt that the participant in the therapy situation engaged in the relation with the therapist. In case raters indicated the movement behaviour as interpersonal engagement they also specified a second step, namely whether the engagement was achieved through:

- spatial actions (movement direction towards the therapist, facial orientation towards the therapist, body or body parts directed towards the therapist), or
- weight engagement (engaging weight towards the partner during shared movement actions), or
- synchronisations in timing between participant and therapist (synchronisation in rhythm or synchronisation in phrase).

Raters annotated their observations into a form that could be completed manually or on the computer or tablet with Excel. During one movement action one to all categories could be present.

The interrater agreement for these first preparatory vignettes was calculated over all raters with Fleiss Kappa for multiple raters, for the separate overarching themes 'interpersonal engagement', 'spatial orientation towards partner', 'weight engagement towards partner' and 'time synchronisation towards partner'. Each category could be indicated with yes (Y) or no

(N). From a first nominal calculation the Fleiss kappa was computed with an online program[7].

Interrater agreement preparatory files	
Overarching theme:	**Fleiss' kappa:**
interpersonal engagement Y/N	0.79
spatial orientation towards partner	0.63
weight engagement towards partner	0.71
time synchronisation towards partner	0.73

Table 6: Interrater agreement on preparatory vignettes (overarching themes & interpersonal engagement)

Raters seemed to agree strongly in their perceptions of the presence of interpersonal engagement by the participant towards the therapist (first step). The agreement on which overarching movement themes were involved during the interpersonal movement actions (second step) showed some variation. The lowest agreement was found on the item 'spatial orientation towards a partner'. This was somewhat of a surprise, as during the training sessions the spatial categories seemed to yield the highest agreement. During the discussion of these results it became apparent that there had been some variation between raters on when to annotate the spatial orientation as an action. Some raters annotated the spatial orientation when it was present from the start of the vignette, whereas others annotated an action's spatial quality only when it was changing and thus newly occurred during the vignette. Hence, it was decided that the spatial items 'body orientation' and 'facial orientation' should be annotated when present at the start of the vignette.

7.5.2 Quantitative outcome rating with a sequential coding procedure

From the first analysis of the movement annotations that were generated with the ELAN software it was clear that there were strong differences between raters regarding the decision

[7] Retrieved from: http://justusrandolph.net/kappa

where exactly an action started and where exactly it ended. For a movement category to be annotated in the template file, raters had to select a fragment of the video vignette, the so-called segmentation (Lausberg, 2013). Once they had selected a time segment they could indicate which category was applicable. However, agreement on segmentation was too low for meaningful conclusions about agreements on the duration and frequencies of SEAM categories within segments.

The empirical findings on raters' disagreement on segmentation were helpful in adjusting the procedure of time framing. Instead of asking the raters to decide on time segmentation, the researcher analysed the type of SEAM categories that movement raters distinguished for a set time frame. This procedure yielded summative data about the presence of movement markers within the set time frame.

Interrater agreement with regard to the content of the movement actions was calculated for each pair of individual raters. Agreement was expressed in terms of percentages and a (nonparametric) sign test was performed to determine whether the agreements found were above random. For each pair of raters the agreement over all movement categories was calculated with Cohen's kappa. Table 7 gives an overview of the results for each pair of raters. Whereas the pairs 1, 2 and 3 show a satisfying percentage of agreement and rather high significance levels, rater combinations 4, 5 and 6 showed lower significance levels of absolute agreement and kappa was not in a convincing range.

Interrater agreement on SEAM categories as taken from ELAN annotation			
Rater couple	**Agreement in %**	**Sign test (* = significance p < 0,01)**	**Interrater agreement in Cohen's kappa**
Rater couple 1	87,5	9,65E-06*	0,697
Rater couple 2	71,875	9,65E-06*	0,600
Rater couple 3	84,375	5,65E-05*	0,675
Rater couple 4	62,5	0,10766357	0,264
Rater couple 5	71,875	0,010030804*	0,395
Rater couple 6	62,5	0,10766357	0,294

Table 7: Interrater agreement on SEAM categories as taken from sequential coding

Further analysis into the differences between raters' annotations revealed a discrepant profile for one rater in comparison to the other raters. This rater was present in combinations 4, 5 and 6. The disagreement seemed to occur mainly in the synchronisation scales. Differences of agreement between pairs of raters were substantially smaller when the synchronisation categories were not included as shown in table 8. Microanalysis of the annotations showed that the diverging rater differed from the others in her annotations of 'synchronisation in time'. She rated repeatedly spatial actions where others rated an action of the type 'synchronisation in time'.

Differences in interrater agreement for rater pairs – Cohen's kappa with and without synchronisation categories		
Rater couple	Kappa including synchronisation categories	Kappa without synchronisation categories
Rater couple 1	.69	.69
Rater couple 2	.60	.52
Rater couple 3	.67	.71
Rater couple 4	.26	.48
Rater couple 5	.39	.60
Rater couple 6	.29	.38

Table 8: Difference in interrater agreement on SEAM categories with and without synchronisation scales

7.5.3 Quantitative outcome rating with observation scale

For the second annotation procedure the SEAM observation scale was handled as an interval coding instrument, where the movement markers could be rated when present. In comparison to the annotation procedure with the ELAN software this was a relatively simple annotation procedure. The simplification of the rating procedure was expected to contribute to an improvement of interrater agreement. Moreover, a simple coding sheet would be easier to apply for the evaluation of therapy outcome in a clinical context of therapeutic practice.

For the second procedure the SEAM markers were used as a list, with the movement categories listed vertically and time intervals written on a horizontal axis. The video vignettes were the same as during the first annotation procedure.

The two raters followed the manualised procedure and they annotated all 24 video vignettes. This procedure generated summative data on SEAM markers present within a time segment. Agreement between the two raters was calculated for each movement category and summatively over all categories. As in the first annotation procedure, agreement was expressed in terms of percentages and a (nonparametric) sign test was performed in order to determine whether the agreements found were above random.

For each movement category the interrater agreement was calculated with Cohen's kappa. The table below gives an overview of the results from this second annotation procedure:

Interrater agreement on SEAM categories as taken from observed intervals			
Movement categories:	**Agreement in %**	**Sign test (* = significance p < 0,01)**	**Interrater agreement in Cohen's kappa**
movement direction	100	1,19E-07 *	1,000
facial orientation	95,65	2,86E-06 *	0,862
body/body-part direction	100	1,19E-07 *	1,000
weight engagement individual	86,96	2,44E-04 *	-0,062
weight engagement with partner	78,26	0,005311012*	0,439
weight regulation with partner	91,3	3,30E-05 *	0,819
synchronization in rhythm	82,61	1,30E-03 *	0,395
synchronization in phrase	78,26	5,31E-03 *	0,573

Table 9: Interrater agreement on SEAM categories as taken from observed intervals

A microanalysis of the category *weight engagement individual* revealed that the raters differed in annotation of *individual weight engagement* versus *weight engagement with a partner* or *weight regulation with a partner*. These differences were discussed in interrater feedback sessions.

For both rating procedures the levels of agreement differed throughout the scales. The highest agreement was found in the spatial categories, for all raters. The weight engagement categories and the synchronisation categories showed more variation. In these latter categories raters' personal perception of the interpersonal intentionality of movement actions was discussed repeatedly during the rater training sessions.

The overall results from the interval coding procedure show higher interrater agreement than those of the sequential rating procedure. The mean kappa for the agreement in the sequential procedure between the pairs of raters was k = 0,487, which according to Altman (1991) is a moderate agreement. The mean kappa for the interval procedure was k = 0,752, which may be considered a good interrater agreement.

7.5.4 Analysis of qualitative data

The raters' comments sheets were screened by the researcher with a structured contents analysis procedure (Zhang & Wildemuth, 2009). The textual analysis was summarised under three global themes: 'comments on movement categories', 'comments on instruction', 'comments on technical issues'; these themes were then complemented with the outcome of the 'evaluation of training procedures'.

Comments on movement categories:

Raters described in their notes that they formed a focus on certain categories that were easy for them to annotate. In these choices a personal movement preference may have biased the rater's observations. When doubting whether or not a certain action was to be coded, raters reported that they first asked themselves whether or not they saw or felt any form of engagement, and only then with which overarching theme (space|weight|time) the movement would fit. Then they annotated the specific movement marker accordingly.

Only few rater comments were found with regard to the category of spatial orientation. Occasionally one rater mentioned that 'use of space' was clearly visible. The researcher commented already in early notes that the space categories did not seem to bear any problems for the annotation process. However, incidentally raters did report some doubts on the annotation of spatial categories when the movers used props. The handling of some

materials entails an action into space, as does for example playing a ball. Such action may not necessarily be addressed to the partner, even if the ball attains the partner.

According to their comments during training sessions and in their journal notes, raters appeared to experience some difficulties in coding synchronisation categories. For example, in some cases it seemed hard to differentiate between *weight regulation* and *synchronisation in phrase*. These categories were addressed during the rater training sessions and feedback meetings. Raters were offered movement experiences to calibrate their observations with their own kinaesthetic experiences of moving. Video vignette examples were analysed together, in order to mutually calibrate the observation of synchronising actions.

The synchronisation categories may also be more difficult to observe, as they seem to fade out of people's awareness. For neuro-typical people synchronisation is an ego-syntonic phenomenon that happens automatically. During training sessions the researcher noticed that this category tended to escape the raters' attention. For some raters it was difficult to differentiate between *synchronisation (in phrase)* and *weight regulation with a partner*, and indeed these two may appear closely intertwined.

Raters commented that they experienced the interaction patterns between participant and therapist as non-pathological interaction patterns when multiple SEAM markers were found present in the movement actions of the ASD participant and when the interaction mode was contingently responsive. In single vignettes this effect appeared to such an extent that raters perceived the scene as a dance improvisation session between two dancers rather than as a therapy session between a patient and a therapist.

All raters commented that their own movement experiences with the SEAM categories had contributed substantially to their understanding of the SEAM markers. During the training

sessions and the feedback session raters were invited to present their questions by means of movement examples. The explorations for the movement markers that would best cover a particular observed action were elaborated in movement as well. Raters found this especially helpful. To support the raters' kinaesthetic calibration regarding the interpersonal movement material, the raters were advised to have a quick movement sequence through the SEAM categories before starting their annotations.

Comments on instructions:

Raters' comments on the instructions in the manual were mainly addressed during the training sessions. The instructions for rating procedures seemed clear enough for the raters to get started with the annotations. Initial questions covered the definitions of the movement markers and how to decide whether or not the observed movements did meet the criteria given in the manual. From raters' comments after the first training session the explanation of the weight categories was revised.

Based on the raters' questions about the annotation procedure, a step-by-step guide was made that was not in the original manual. A decision tree was offered in order to structure the annotation process:

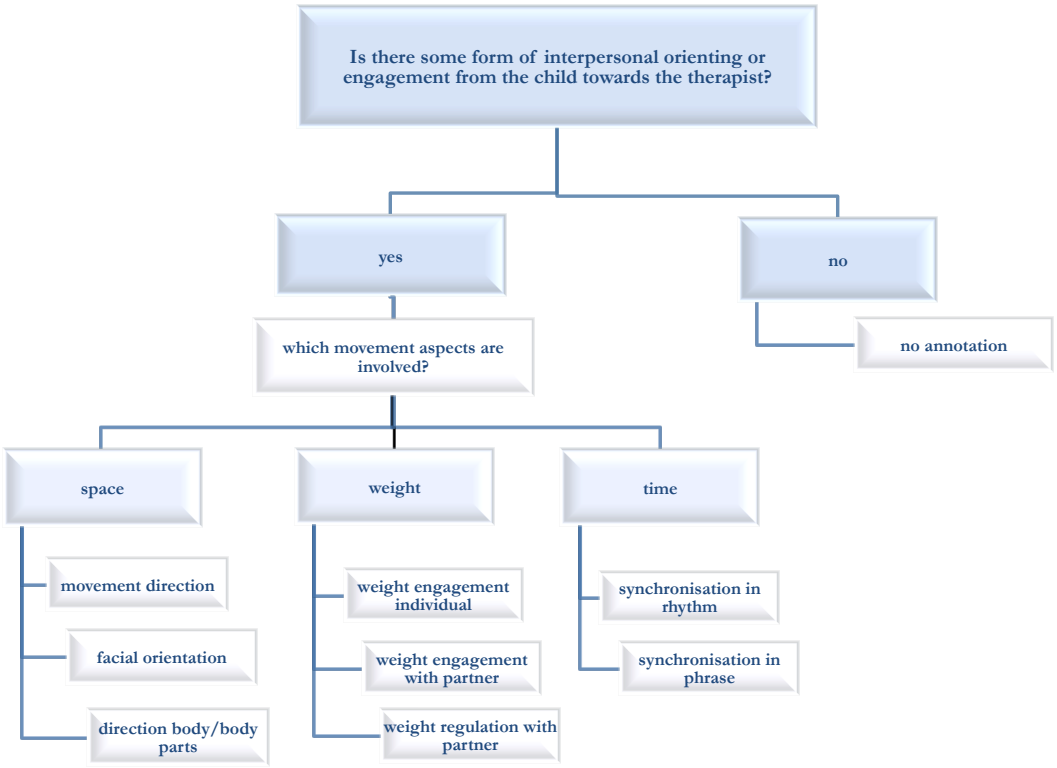


Figure 14: Decision tree for SEAM annotation

Comments on technical issues:

Before the start of this study the raters differed in their technical expertise to handle annotation software, spreadsheet software, and storage procedures. These differences were sought to be ruled out by training the technical handling of data during the interrater training sessions and by providing a helpdesk function throughout the rating process. Yet, differences in technical expertise may still have played a role throughout the annotations, especially during the more complex procedure with the ELAN software.

Raters' comments on technical issues during training sessions mainly concerned questions on how to handle the software or how to handle the hardware procedures. Questions typically were about opening password protected video files, loading files into the software program, loading template files for annotation procedures into the software. In their comment sheets raters reported problems in handling the tool's technical options, such as working with

segmentation or placing annotations in ELAN. Raters commented that they experienced that training effects with respect to the technical options to a certain extent extinguished between rating sessions. So some time had to be reserved before the task of annotating for the raters to become at ease again with the technical equipment. Once they were able to find the inbuilt help functions of ELAN and had practiced with the manual instructions, they were able to run all annotations autonomously without technical problems. The training of the techniques for segmentation and annotation did require much time during training and coding sessions.

Evaluation of training procedures

In the exit evaluation forms raters indicated their experiences with the annotation process on a Lickert scale on items concerning training content, ongoing activities, instructions, annotation tools, skills, annotation process. Additionally they were asked about the most/least valuable aspects in the training programme and there was an open question as to whether they had any further comments.

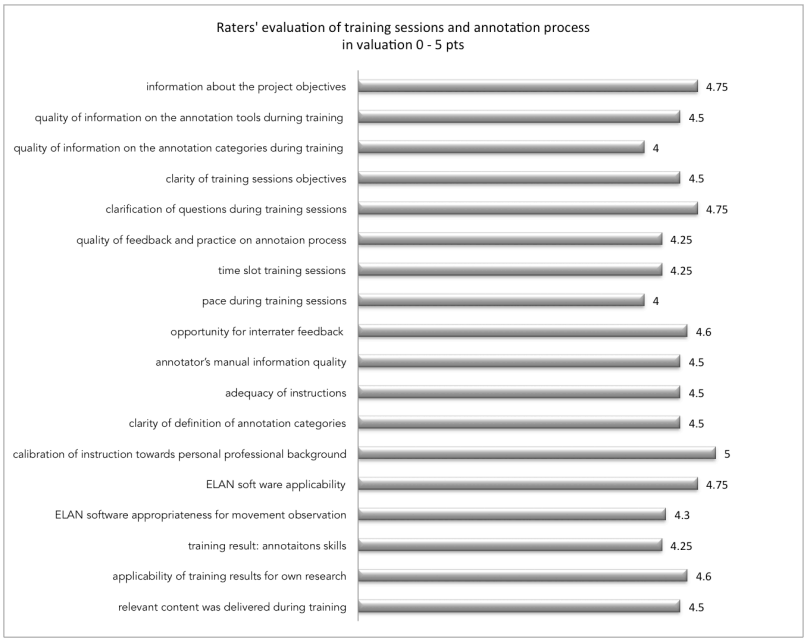


Table 10: Overview Rater's evaluation of training sessions and annotation process

In the open questions raters suggested that less vignettes per rater might have been easier to work with in the annotation process. Another suggestion was that there were too many categories to observe during annotation with the software program. This remark was made with respect to the first annotation (ELAN) procedure and it was found to correspond to comments by other researchers who recommend a maximum of 5 observation categories (Lausberg, 2013; Cruz & Feder, 2013). However, for the second rating procedure, where SEAM markers were assigned to intervals manually, the number of categories has not been reported a problem.

Different rating procedures (sequential or interval procedure) for this project have been performed with different technical equipment. The less technical expertise is required, the more the raters felt that they could work from their own kinaesthetic felt sense of the video vignettes. Raters' comments show that rating procedures and technical instruments have an effect on how skilfully raters felt that they could handle annotation categories, even when they had had an intensive training background in movement analysis.

Raters recommended allotting more time for the training sessions. The learning of the content was strongly supported by own movement experiences and by interrater consultation during the feedback and training sessions.

7.6 Discussion and perspective

The purpose of this study was to show content validity of SEAM markers as shown through multiple raters' agreement.

Both tested rating procedures lead to relatively good outcome of interrater agreement. The first (sequential) rating procedure supported the growth of agreement between raters on action impulses and interpersonal intentionality in movement patterns. “Point by point agreement is especially useful for observer training prior to data collection and for ongoing checking of observers once data collection begins.” (Bakeman & Quera, 2011, p. 58). The second (interval) rating procedure yielded a summative agreement, of the type that Bakeman & Quera (ibid.) consider useful, when a project shifts from explorative data collection to data analysis.

The empirical data as collected in this study are affected by the preceding training of observers. A variety of dimensions have shown to be of relevance as observation scores became available. It turned out that the following dimensions are affecting the raters' behaviours:

a) the levels of sophistication and training background in observing and rating dance and movement. Also experienced observers needed specific instructions on the interactional movement qualities in order to adapt to the concepts and the phenomena this study is concerned with
b) the recognition and determination of the moments of onset of relevant interactions
b) the level of specificity of the observations
c) the length and speed of the video clips and vignettes.

During training we found that personal preferences affect movement perception, and this was countered by means of shared movement experiences. Neuro-typical observers showed a relative blindness to neurotypical interaction patters, which was most outspoken in the categories 'weight regulation' and in the synchronisation categories. This may be influenced

by brain networks (that include prefrontal areas and posterior cingulate and hippocampal gyrus) that map familiar action patterns into personal empathetic feelings. Watching familiar interaction structures reduces the observer's distance to the object of his observation and engages the watcher into empathetic responsiveness (Burgess, Maguire, & O'Keefe, 2002). Brain research on mirror neuron structures also showed that action observation evokes individual and personal motor representations in the observer's brain (Calvo-Merino et al., 2006).

During the training sessions for this study we also found the experiential equivalent to this phenomenon. A rater who could not identify the movement just from the visual information was invited to perform the observed movement herself. She had initially some trouble to find the right momentum, and when she finally did, she explained "now I feel weight". This movement experience changed her perception of what she had visually observed before. Throughout training and feedback sessions this phenomenon was repeatedly present. The visual input was examined through movement experiences, thus mapping the observed movements into the personal movement repertoire. These findings relate to other studies on validation and calibration of movement observation tools that also integrated experientially focused rater training (Koch, 2007; Lausberg, 2013; Bräuninger & Züger, 2007)

The relative diversity between raters in segmenting video vignettes indicates a more general problem in movement observation and annotation. The movement activities in a DMP context may vary from small movements in the body to large movements covering a lot of space. The interpersonal movement behaviours may occur in a small gesture of a hand or in a large action throughout space, and this may impede quick decisions about the exact onset of an action. Although segmentation had been addressed during the training sessions, the variety of movement material played a definite role in the raters' diversity of segmentation.

Furthermore, the perception of an action's exact onset also seems to depend on the observer's intuitive subjectivity. The decision whether or not someone is orienting and engaging towards a partner arises from the context, which is felt in the person's intention to move towards the shared situation. Naturally the decision on the onset of an interpersonal action bears a certain ambiguity, in that the movement observer makes an external one-sided decision on a two-sided, mutual action between two movers. The observer's own felt sense on the intentionality of an action, therefore, may also have contributed to the differences that were found between observers on the segmentation of movement actions. As complex as this is for the context of research, it is the very essence of DMP practice.

The findings from this study suggest that the SEAM movement categories originally gathered for their experientially meaningful potential are also suitable for the use by other movement observers, who did not participate in the original situation. The mean results from the interval coding procedure showed higher interrater agreement.

Variation between raters may influence the results of therapy outcome measurement with the SEAM observation scale. Future rater training needs to address this by early feedback sessions and by interrater calibration through movement experiences. The lower the impact of both personal and technical issues, the more freedom raters will experience to annotate the movement categories from their own embodied experiences. The work with annotation software has shown to be very time consuming. The overall statistical outcomes indicate that the manual annotation procedure leads to more consistent results. Moreover it has shown much less time consuming. Both aspects will be of interest in the application of the SEAM observation scale in practice based research or in therapy outcome evaluation.

In sum, the outcomes suggest that SEAM observation with an interval manual annotation procedure leads to a satisfying interrater agreement. In research step 4 we will investigate the

usefulness the movement categories of the SEAM observation scale in comparison to outcome data from standardised questionnaires instruments that investigate interpersonal engagement and attunement behaviours in children and adolescents with autism.

Chapter 8

Study 4: Patterns of change

"The known also includes …the body's predilection for making certain kinds of selections from a vocabulary or a sequence of movements"
(Susan Leigh Foster, 2003, p.4)

8.1 Introduction

This chapter will focus on the integration of the results of Study 1 and Study 2. Up to now the focus of the studies has been on retrospective (content) analysis with the formulation of a therapy model and an observation scale as results. This chapter presents the replication of the DMP intervention Shared Movement Approach that had been described as a result of Study 2. It will investigate the applicability as an outcome evaluation tool for the SEAM observation scale, which had been described as a result of Study 1.

8.2 Shared movement approach and SEAM inventory: modelled intervention and outcome measurement

The present study was the final one of four studies. It was meant to integrate the findings from the previous studies into one prospective study on the effects of DMP on interpersonal relating in young adolescents with ASD.

The aim of this study was i) to replicate the Shared Movement Approach (SMA) as an intervention in repeated N=1 dyadic DMP with young participants with autism, and ii) to relate the results of observations with the SEAM observation scale to the results of standardised parental questionnaires and by youth self-report questionnaires, as well as by a parental questionnaire on social behaviour in ASD.

Thus, information was to be obtained about the consistency of the therapy method in that it may show to be replicable and to reproduce outcomes previously obtained from earlier, successful cases of SMA with autistic participants. For a single case design replication of therapy outcome on a case-by-case basis is considered to contribute to generalisability of a method (Hilliard, 1993). In the context of practice based research replication of treatment outcome may be shown through symptom reduction, the use of multi-method evaluation and the illustration of clinical significance (Kadzin & Weisz, 1998). For this study the SMA approach served as underlying treatment model.

Replication for the context of therapy may be expressed in replication of within subject outcome post intervention as expressed in a multi-method outcome evaluation (Kadzin & Weisz, 1998), in addition treatment effect in single cases may be shown through the evaluation of a behaviour of interest over time throughout the therapy process with a time-series analysis (Hilliard, 1993).

The SEAM observation scale had already shown to produce some agreement in content in the use by multiple analysts in Study 3. To investigate whether the criteria of a tool test for the relevant content, it should produce a correlation with other instruments that cover the same domain (McLeod, 2007). The SEAM observation scales may be of use for the evaluation of interpersonal relating behaviour within the context of DMP, but do they convey a correlation with interpersonal relating outside the context of therapy. If a relation was found between the outcomes of the SEAM scale and the outcomes of other, standardised measurement instruments, then this would support the validity of the construct of the SEAM movement scales. Accordingly, SEAM markers were compared to the Child Behaviour Checklist (CBCL) and the Youth Self Report (YSR) that both examine the perception of problems in social behaviour in general. In addition they were compared to the Social Responsiveness Scale (SRS), a parental questionnaire developed to investigate the social responsivity of children and adolescents with ASD. The CBCL and YSR consist of several subscales, that together test for a broader domain of social behaviour. For this study only the subscales *somatic complaints* and *social problems* were selected for comparison. The *somatic scale* gives an indication of the participants' somatic wellbeing, which is of direct influence on the experience of movement situations. The subscale *social problem* is considered to be directly related to problems experienced during interpersonal relating.

It was hypothesised that an increase of SEAM scores would correspond to a decrease of problem scores on these questionnaires.

8.3 Testing the SMA and SEAM models in four single cases

The present Study 4 was conducted as a prospective field study in the clinical setting. The dyadic DMP intervention with adolescents with ASD was conducted as repeated N=1 case study in the natural outpatient therapy setting of the mental health care department of ORBIS GGZ, a Dutch outpatient mental health care institution.

A pre post intervention measurement design was applied to capture the changes that might occur in the interpersonal social behaviours of the ASD participants. In addition to pre-post-therapy measurements, SEAM observations were taken of successive moments, specified in advance, throughout therapy.

8.3.1 Participants

Participants for this study were recruited over a period of one year from regular referrals for DMP at ORBIS GGZ. Young adolescents with ASD, who had been referred to DMP after the intake procedure or, while having already been in care for some time were invited to take part in the study. All participants were relatively high functioning (IQ > 80) and had been classified on the autistic spectrum according to the Diagnostic Statistic Manual (DSM) version IV. Diagnostics were performed through child psychiatric diagnostic procedures. Adolescents were referred for DMP therapy within the regular treatment programme paths of the mental health care department.

Adolescents and their parents were informed about the project during the first meeting with the DMP therapist and they received the relevant information in writing. After they had given their informed consent, participants started the DMP trajectory. In accordance with the department's policy, every client (system) was also coupled to a case manager and to a

psychiatrist or a clinical psychologist, who were available for the participants during the entire DMP treatment. After the post-therapy session, which was part of the research path, the case manager invited participants and parents for an evaluation session, which is a standard procedure of the department.

The project was presented to twelve adolescents, of which four decided to participate. These four, three males and one female, followed the procedure all the way through. Mean age of the participants at the start of therapy was 14,9 (lower: 11,9, upper: 17,1).

Others decided not to participate in the project for diverse reasons. In some cases DMP had not been taken up at all. For those clients who did follow DMP treatment, the most frequent reason for not participating in the research project was that they didn't want to be video-taped during their therapy or that they did not want others, in this case the movement analysts, to see them in video-samples.

The control SEAM observations throughout this study have been performed by one of the movement analysts who had participated in Study 3.

The researcher acted as a therapist in all clinical activities observed. She also analysed some of the video materials with the SEAM scale, and it will be indicated below when this was the case.

8.3.2 Ethical considerations

Participants were informed about the project, both personally and in writing. After a first introduction of the project by the participant's personal case-manger, the therapist introduced the project in a personal meeting and handed the information letter and the

consent form to those who were interested. After this meeting, adolescents and parents had two weeks to decide about participating. A free choice was warranted. Participants were assured that a decision against participating would not have any repercussion on the therapy offered, and also that they were free to terminate their participation in the research project at any moment without negative impact on their treatment trajectory.

All collected data were stored as part of the patient file of the participant according to the Dutch mental health professional guidelines. Video-materials were stored on password-protected hard disks that were kept in closed lockers. Only the researcher or other [legally] competent mental health professionals had access to these materials. All information that could lead to personal identification of participants was taken away from the filed materials. Stored files were password-protected and labelled with anonymised codes.

As in the other studies, the movement analyst signed a privacy statement regarding the confidential handling of the video materials according to Dutch Mental Health Guidelines on privacy. She had at no time access to the complete session files, but she was only provided with a randomised set of vignettes, small fragments taken from the session files, for the analysis. These procedures have been described more in detail in Study 3.

The movement analyst gave her written consent for their analyses to be used in the research project. All analysts signed a privacy statement, in which they declared to handle all video-materials according to the Dutch mental health care policy regarding privacy.

The researcher as a therapist was bound to the ethical code of practice of the professional license board and as a member of the treatment team she was also bound to the Dutch Mental Health Guidelines on professional ethics throughout the entire project.

8.3.3 Data collection

The data collection was conducted in the outpatient youth department at ORBIS GGZ. All participants followed a 12 sessions DMP programme conducted in the Shared Movement Approach (SMA) that has been described as an outcome of Study 2.

Before and after the 12 sessions SMA a free movement session was held that served as pre and post measurement point respectively. The participants and their parents completed standardised questionnaires on social behaviour outside the therapy context. Participants completed the Youth Self Report Questionnaire (YSR) (Achenbach et al., 2008), and parents completed the Child Behaviour Check List (CBCL) (Achenbach et al. 2008) for youth age six to eighteen years. Parents also completed the Social Responsiveness Scale (SRS) (Roeyers et al., 2011) at both measurement points. The SRS is an instrument for screening social competencies in youth age four to seventeen with autism spectrum disorders. The SRS gives an indication of the seriousness of autistic traits in every day social interactions as reported by parents and caregivers.

All movement sessions were recorded with a digital camera that was in a fixed position throughout all the SMA sessions. Video vignettes from the pre and post movement sessions and from the therapy sessions 1, 4, 8, and 12 were used for movement analysis. For each participant a total of 270 minutes (six sessions of 45 minutes) of video footage was screened for this study.

For the SEAM analysis, samples of five minutes from the observed sessions were selected. First, a compilation was made of all intervals from a session in which both therapist and participant were visible. Then, from this compilation the most central five minutes were chosen as the video vignette to be analysed with the SEAM observation scale by two movement analysts.

Video samples were presented for movement analysis in randomised series. Analysts, other than the therapist, were not informed about the vignette's session number. Movement analysis was performed by the therapist and a second analyst for interrater agreement control with the SEAM observation scale that had been developed in the course of Study 1. For this study an interval annotation procedure was used, that had shown a higher interrater reliability in Study 3 than the sequential annotation procedure. Observers rated each vignette, for each of its five minutes and for all SEAM categories whether or not the behaviour of a category was present. Thus, five scores for all eight SEAM categories were obtained for each vignette. Interrater agreement was calculated with Cohen's kappa.

8.3.4 Data analysis

All results were analysed with descriptive statistics. For the analysis of differences or analogies between outcome of social questionnaires and SEAM scale, the pre-post therapy results of both measures were compared for individual subjects and for the group averages.

The number of subjects was too small for parametrical tests to be of sufficient power; hence nonparametric procedures were used to calculate variance and pre-post effects, within subject as well as for group averages. Gain scores, i.e. the change of scores between moments in treatment, were taken as indicators of treatment outcome (Sukin, 2010). This fits well with the natural setting of the study, where it is good practice to use gain scores on standardised instruments to determine the significance of treatment outcomes.

Outcome pre post intervention on the social questionnaires was calculated according to the clinical cut off values for the Dutch standard populations as they are indicated in the manuals (Achenbach et al., 2008; Roeyers et al., 2011). Differences were indicated as

significant in case they met the clinical criteria for significant changes in outcome scores between two measurements (ibid.).

Pre-post therapy outcome of the SEAM scale was compared to outcome of the SEAM scale at successive measurement points throughout therapy. The variation of interpersonal attunement behaviour throughout the course of DMP sessions was taken from the SEAM scores and was calculated with a Friedman rank test in Excel. The gain scores between pre and post therapy from the SEAM movement observations were correlated with those from the social questionnaires pre post therapy.

8.4 Results

8.4.1 Results of the questionnaires

Results of the Youth Self Report questionnaire (YSR)

The scores on the *somatic* scale of the youth self report showed in the group average a lower problem score post intervention.

Three participants had a decrease of problem scores with 4, 6 and 12 points respectively; the scores of one participant were the same pre-post intervention. The scores on the *social* scale of the youth self-report questionnaire showed in the group average a lower problem score post intervention when compared to pre intervention scores. In this scale the profiles showed most variation, with one participant pre-post on the same score, one participant with

a slight, but not significant increase and two participants with a decrease in problem scores of 2 and 8 points respectively.

Results of the Child Behaviour Checklist (CBCL)

The results on the *somatic* scale of the parental questionnaire showed for the group average a lower problem score post intervention. In the profile of one participant the score on the *somatic scale* was slightly higher post intervention, this was not taken into specific consideration because both outcomes were below the critical threshold of pathology.

The results on the *social* scale of the parental questionnaire showed for the group average a lower problem score post intervention when compared to pre intervention scores. Three participants had a decrease problem score of 3, 9 and 5 points respectively; for one participant the score pre-post intervention had not changed.

Results of the Social Responsiveness Scale (SRS)

The outcome of the SRS was measured as the sum of scores of all subscales. Between participants there was a mild difference at therapy start. All but one showed a clinically significant change on the SRS after therapy.

Problems in social responsiveness post intervention when compared to pre intervention scores diminished for the group average calculation with 2 points, which is considered a clinically significant reduction of problem scores (Roeyers et al., 2011).

The calculation of the Gain Scores between pre and post intervention outcomes showed for the group's average results a positive trend over all tests. After subtraction of post-pre therapy results a relatively high difference for the somatic subscale of the YSR, the somatic

CBCL subscale and for the social CBCL subscale, indicating a decrease of problems experienced within these domains.

The social subscale of the YSR showed a Gain Score of 2.25, the pre-post comparison of the SRS scale showed a Gain Score of 2 points.

Social questionnaires pre-post				
		N=4		
		mean (SD)	range	gainfactor
YSR somatic	before	57,75	(54-64)	
	after	52,25	(50-55)	5,5
YSR social	before	61,75	(50-78)	
	after	59,5	(51-70)	2,25
CBCL somatic	before	64	(53-72)	
	after	60	(53-64)	4
CBCL social	before	68,25	(53-84)	
	after	63,5	(50-77)	4,75
SRS	before	49	(43-55)	
	after	47	(44-52)	2

Table 11: Overview group averages of the outcome of Gain Scores on social questionnaires for the group average (N=4) pre vs. post

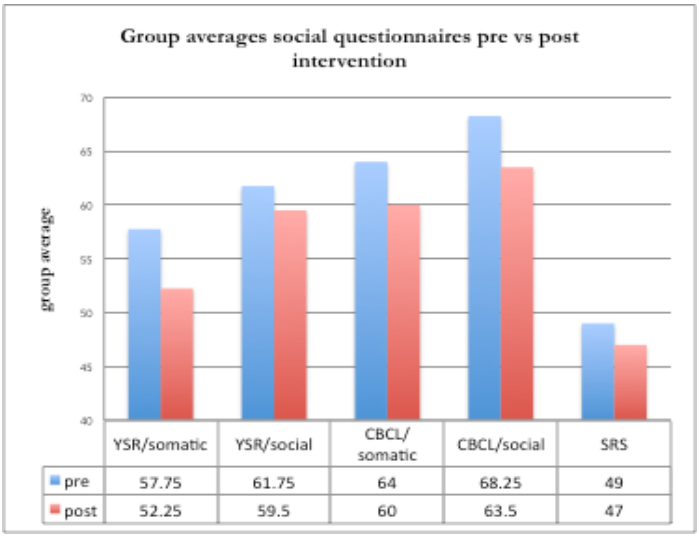


Figure 15: Profiles of problem reduction on social questionnaires in terms of Gain Scores (post minus pre) for the group average (N=4)

The outcome of the Gain Scores analysis within subjects gave a somewhat irregular pattern. Not all participants improved in all tests. This may be due to differences between participants beforehand and in some cases it may be due to within subject differences between scores on self-report and on parental report. There was diversity at the pre intervention measurements in participants' scores on the self-report subscale *social problems*, two of them reported problems within a clinical percentile whereas the scores of the other two were not in a clinical percentile. The variation between participants on the subscale *social problems* in the parental reports was high at the start of the therapy, varying from high clinical scores for two participants to non-clinical scores for the other two. The participants with a higher problem score at start of the therapy showed higher symptom reduction post therapy than did the participants whose scores were not in the clinical range.

Gain factors soc. Questionnaires		**prt 1**		**prt 2**		**prt 3**		**prt 4**	
		factor	gain	factor	gain	factor	gain	factor	gain
YSR/somatic	pre	55		54		58		64	
YSR/somatic	post	55	0	50	4	52	6	52	12
YSR/social	pre	51		68		78		50	
YSR/social	post	51	0	66	2	70	8	51	(-)1
CBCL/somatic	pre	53		70		72		61	
CBCL/somatic	post	53	0	59	11	64	8	64	(-)3
CBCL/social	pre	53		84		82		54	
CBCL/social	post	50	3	73	11	77	5	54	0
SRS	pre	43		55		49		49	
SRS	post	44	(-)1	52	3	46	3	47	2

Table 12: Within subject gain points on soc. questionnaires

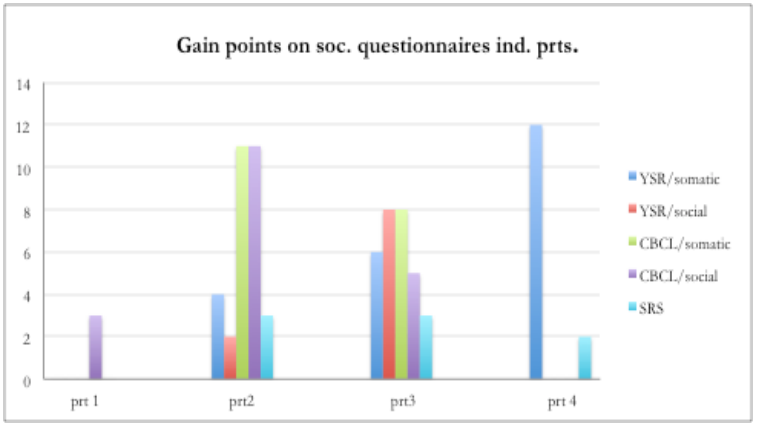


Figure 16: Within subject profile of Gain Scores on social questionnaires pre vs. post intervention

8.4.2 Results of movement analysis (SEAM)

The SEAM scale observations of random five minutes samples of the pre and post intervention movement session revealed for all participants an increase in all categories. With the pre therapy measurement as baseline the summative gain score over all SEAM categories was calculated for measurement at several time points (TP) throughout therapy and post therapy (TP pre, TP 1, 2, 3, 4, TP post). The individual profiles of this calculation showed a substantial increase of the SEAM categories involved.

The patterns of how the SEAM scores developed over time between measurement intervals showed substantial similarity between participants. For each participant there was an increase on the scores of the individual SEAM categories as well as an increase in the number of categories found present during the movement actions.

SEAM repeated measure points- ind participants						
	pre tp	tp 1	tp2	tp 3	tp 4	post tp
gain prt 1	0	0	3	7	15	17
gain prt 2	0	1	8	5	14	24
gain prt 3	0	1	3	2	20	24
gain prt 4	0	4	6	20	16	15

Figure 17: Overview of the summative Gain Scores on SEAM observation scale for individual participants at the various measurement points

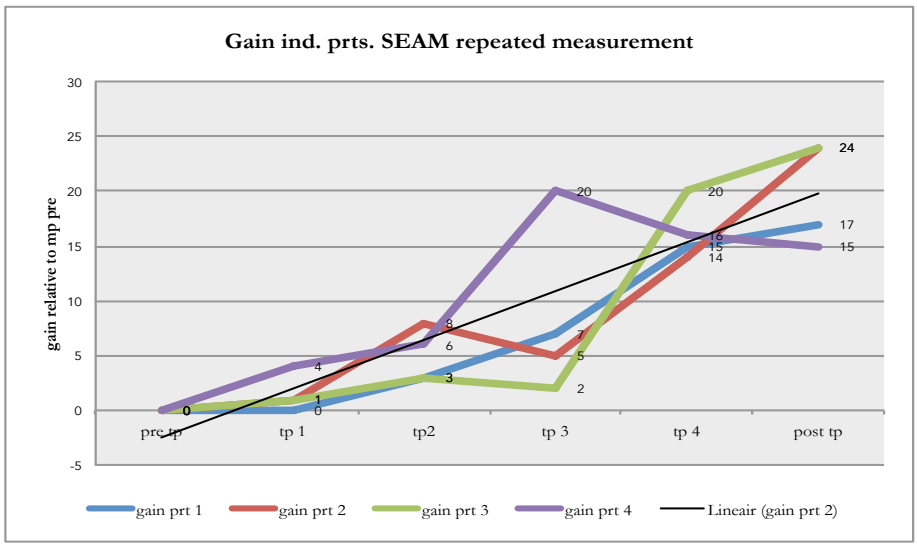


Figure 18: Development gain scores on SEAM categories within subject over time points throughout therapy.

The summative group profiles showed an increase of SEAM scores for all categories. The spatial categories *movement direction, facial orientation* and *body/part direction* were already more present at the start of the therapy. The weight categories *weight engagement towards a partner, weight regulation with a partner* and the synchronisation categories *sync in rhythm* and *sync in phrase* were rare or not at all present at the start of therapy. The engagement and attunement categories developed stronger throughout therapy than did the spatial categories.

The changes of the mean SEAM scores for all participants over time (pre TP, TP1 – TP4, post TP) were calculated with a non-parametric Friedman test of differences among repeated measures.

For the difference in SEAM for all categories pre-post intervention Chi square χ^2 = 16.893, with a significance of $p < 0.0047$*. For the changes of all spatial categories over time Chi square χ^2 = 11.393 with a significance of $p < 0.044$*. For the changes of all weight categories over time Chi square χ^2 = 14,250 with $p < 0.014$*. For the changes within the synchronisation categories over time Chi square χ^2 = 11,536 with $p < 0.042$*. The changes within the weight and synchronisation categories were tested separately because they were hardly present at start therapy and they rendered a Chi square χ^2 = 15,000 with $p < 0.010$*.

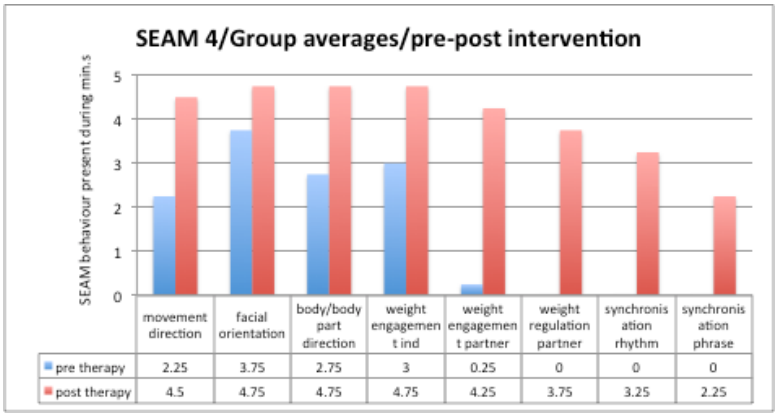


Figure 19: The pre-post differences between group averages for all SEAM categories

A Wilcoxon Signed Rank test indicated that median post treatment scores of the group averages on the social questionnaires were with Z = -3.063 and a p= .002 significantly lower than the median scores pre-treatment. The median scores of the group averages on the SEAM observation scale were with Z = -2.524 and p = .012 significantly higher than the median scores pre treatment.

Interrater agreement for this study was calculated with Cohen's kappa and indicated a good interrater agreement with k = .72 over all SEAM categories. The results for kappa on the individual categories showed balanced levels of agreement.

8.5 Discussion

In Study 4, the Shared Movement Approach (SMA), which had been described as an outcome of Study 2 was applied in four N=1 cases of DMP intervention.

The SMA model was taken as therapeutic method, conducted over twelve sessions. The movement actions and interventions of the therapist throughout the therapy process were

driven on observations of the SEAM movement behaviours of the participants. This may have contributed to an equally effective outcome on interpersonal attunement behaviour as had been shown in Study 1. With 12 sessions the duration of therapy during Study 4 was substantially shorter than the cases that had been analysed in Study 1, which all had taken approximately nine months. The outcome profiles of SEAM scores of the individual participants showed increase over time for the interval measurements. This was taken as in indicator that the SMA intervention indeed succeeded to replicate the results in repeated N=1 cases.

For the outcome analysis of the social questionnaires, the clinical Gain Scores were taken as markers of change. The group average outcomes show a positive trend towards symptom reduction and improvement of interpersonal relating. The parental social questionnaires and the self-report questionnaires are measures of the social problems as perceived and reported by the respondent. These standardised instruments serve clinical outcome evaluation as accorded by Dutch mental health guidelines and therefore they fit with the aim of this study to investigate the clinical relevance of the outcome of SMA.

The individual profiles of the social questionnaires revealed variations across participants for the scales on the YSR as well as the scales on the CBCL. These individual differences showed also in the individual participants Gain Score profiles over the questionnaires. This circumstance might be due to individual differences at the start. All the questionnaires – although standardised – measure *perception* of problem behaviour, or in the case of the YSR, the adolescent's personal perception of experienced problems. This typically yields a broad range of outcome in the context of clinical treatment. Clinicians interpret these results within the context of the developmental features of a child. So it might be possible that an increased score on a subscale (that in case of this study was still in the *non*-clinical range) is not interpreted in terms of increase of problems, but in terms of increased sensitivity to certain

items. Or an increase in scores might, again depending on the context, be interpreted as an increase of felt permit to point out problems, once parents experienced that their child was changing for the better. Individual scores that were not in the clinical range at the pre measurement showed a lower Gain Score than those scores that were in the clinical range at the outset.

The differences between participants in scores on the questionnaires have been discussed with clinicians at several moments throughout the study. The variations were regarded to be normal variances as they occur in a clinical setting. As for this study we did not perform statistical analyses based on these outcomes of the questionnaires it did not trouble the results. However, even with the variations between participants and variations between youth self-report and parental report we find that the trend for all categories with clinical scores is pointing towards problem reduction. This trend showed for within-subject measurements as well for the within-group measurements.

The SEAM observation scale was used in this study in a schedule of random samples consisting of five consecutive one-minute intervals, in which all the movement categories were scored as either present or non present. The observation sheets were easy to score for the analysts and the categorical set up with a category scored as present or not present served a quick processing into statistical procedures.

The results show that the profiles, can contribute to outcome evaluation in that they reveal the participants' increase in SEAM behaviours over time throughout therapy. From the analysis of SEAM movement markers, it shows that all four participants throughout therapy developed towards an increase in use of movement categories that were already present in the first movement session. In addition they all developed new aspects of interpersonal movement interaction within the use of the categories that indicate engagement and

synchronisation behaviours. The use of *weight engagement with a partner*, *weight regulation with a partner, synchronisation in rhythm* and *synchronisation in phrasing* occurred as new behaviours in the course of therapy. This shows that during the SMA intervention the participants developed towards an increase within single SEAM categories, they developed towards the use of new SEAM behaviour and in addition they developed towards an increase in complexity of SEAM markers involved in the movement actions. These results taken together may point to an increase in interpersonal relating behaviours. This seems to be supported by the reduction of social problems and the reduction of problems in the social responsiveness that showed from the questionnaires.

The participants' individual profiles of the SEAM scores over the continuous measurements throughout therapy showed substantial similarities. One or more of the spatial categories *movement direction, facial orientation* and *body/part direction* were present at the pre measurement point but seemed to develop towards post therapy measurement point towards an increase in scores. The weight categories and the synchronisation categories were poorly present at the start of the therapy but developed towards the end of the therapy with an increase in scores over the measurement points. Similar patterns had been shown in the results of measurement over time in Study 1. If taken into a combined analysis the eight single cases of both studies reveal similar developmental patterns of SEAM behaviours. In all participants the orienting behaviours that show in the spatial categories, are mostly present already at the start and in the early phases of the therapy; the engagement behaviours that show in the weight categories, follow the orienting behaviours; then, the synchronisation behaviours follow from the engagement behaviours. The orienting towards a partner precedes engagement, which in turn precedes synchronisation with a partner. This pattern shows a similar succession as the development of the early dyad between child and caregiver towards primary intersubjectivity. Regarding the problems of interpersonal relating that children and adolescents with autism face, it seems an important feature to follow and support the

emergence of social orienting, engagement and synchronisation behaviours when they occur in a natural interaction. The SMA approach seems to offer a context for a developmental approach to the participants' interpersonal relating behaviour and may thus support the child to catch up with forms of interpersonal relating that had not been developed before.

Although this study faced a small sample size (due to institutional reorganisation) it was possible to replicate the results of earlier cases that had been evaluated positively and that served as a base for the development of SEAM and SMA.

In comparison to the earlier clinical cases the results of this last study show similar outcome profiles on the SEAM categories. These may also be taken as an indicator for the successful the replication of the intervention.

Furthermore the comparison of outcome on social questionnaires as compared with the outcome of SEAM observation scale shows substantial correspondences between the increase of SEAM behaviours and the decrease of reported problems on somatic and social scales.

The overall trend of Gain Scores has shown to be positive for all group measures, with significant changes $p < .05$ for all SEAM categories and with reported problem reduction on the SRS, CBCL, somatic and social, YSR somatic and social.

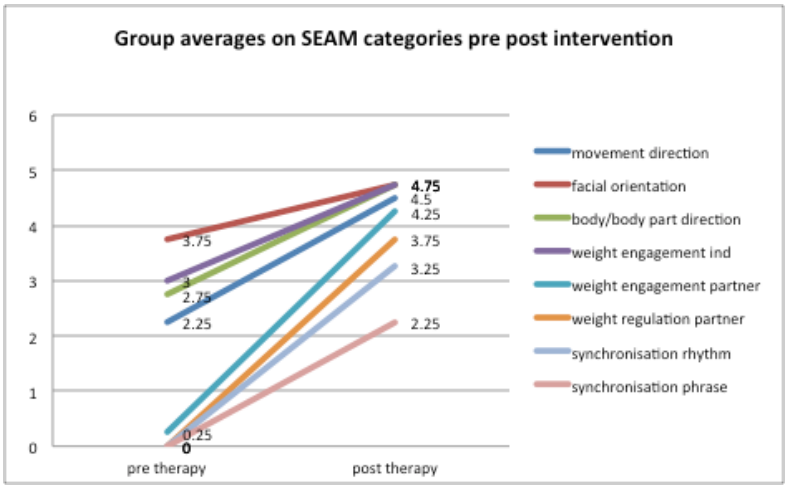


Figure 20: Group averages SEAM categories. pre post intervention – increase interpersonal relating beh.

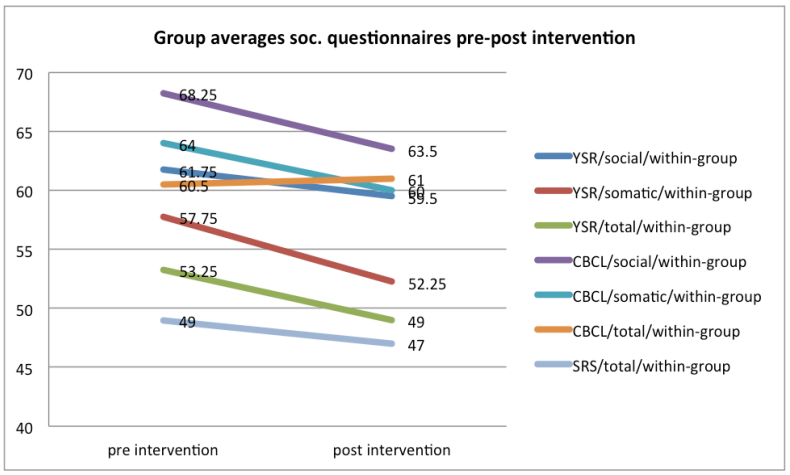


Figure 21: Group averages soc. quest. pre post intervention – reduction on problem scales

Chapter 9

Summarising the findings and discussion

"…every movement leaves a trace"
(Charley Morrissay, 2008)

9.1 Introduction

This chapter will summarise the findings from the four research steps. The discussion will integrate the outcome from the separate research steps in view of the initial aim of the project. The findings will be discussed in relation to current theories and their implications for the DMP practice.

9.2 Rooting back to the beginnings

The aim of this research was to investigate the effectiveness of DMP intervention in children and adolescents with ASD with regard to interpersonal attunement and engagement.

In the clinical setting during outcome evaluations parents had reported their impressions that the ASD participants adjusted and attuned their actions better to them, to siblings and to playmates after the DMP intervention. Also schoolteachers reported better adjustments to classmates as seen in the playground or during movement situations.

These promising clinical evaluations could not yet be related to systematic outcome measurements. To monitor DMP effectiveness on interpersonal attunement, the intervention and changes in the ASD participants' interpersonal attunement behaviours needed to be studied more systematically.

To that purpose, a research project would have to cover the general questions of how the natural DMP situation can be investigated in a systematic way and how to monitor outcome evaluations with regard to social attunement.

As no specific behavioural markers were available to evaluate the effects of DMP in ASD on interpersonal relating, the research had to analyse and clarify which observables would cover the interpersonal behaviours that contribute to attunement in interpersonal relating. Hence, an explorative research approach was a first concern, in order to observe the therapeutic relationship in the natural DMP setting, with a special focus on the emerging interactions between participant and therapist. Accordingly, the events that occurred within shared movement situations between participants and therapist served as a frame of reference for the observation of interpersonal attunement behaviours and interventions in DMP.

After these situations had been analysed in terms of interpersonal attunement, several categories for the observation of such behaviours could be defined. These were used subsequently within a coding matrix, for observations at set time-points throughout the therapy process. Thus, a more systematic analysis of interpersonal behaviours between the

ASD participants and the therapist was aimed at, one that would permit to investigate the relationships between observation categories and to monitor the changes within and between categories over time (Cruz & Koch, 2004; Strauss & Corbin, 1998).

A multi-method research path was chosen to capture the complexity of the situation.

The research was conducted through a series of steps:

Evaluation of DANCE MOVEMENT PSYCHOTHERAPY outcome in interpersonal attunement behaviour of children and adolescents with autism spectrum disorders			
Step 1 retrospective movement analysis of interpersonal relating throughout DMP	**Step 2** contents analysis of DMP intervention in the treatment of participants with ASD	**Step 3** evaluation of interrater agreement with the SEAM observation scale	**Step 4** replication of outcome of Shared Movement Approach intervention and SEAM observation scale

Table 13: Composing research steps

9.3 Summary of findings

The details of the findings have been discussed in the corresponding chapters. At this place a summary of the major points is offered.

9.3.1 Findings from Research Step 1:

The contents analysis of four cases of DMP with ASD participants with regard to the development of the child's embodied relating behaviours yielded movement markers that

could serve as observation categories for a more systematic observation of interpersonal relating behaviours.

The domain of our interest in this retrospective analysis of four cases of DMP was the ASD participants' capacities to relate to others.
A grounded theory approach to the material, in which an open coding was taken as point of departure, was helpful to develop well defined movement markers of interpersonal relating. The obtained qualitative data were structured into an observation scale for Social Engaging and Attuning Movement behaviours, the SEAM scale, with overarching themes (space, time, weight) and specific movement categories (movement direction, facial orientation, body/body part direction, weight engagement individual, weight engagement with partner, weight regulation with partner, synchronisation in rhythm, synchronisation in phrase). With a specified annotation procedure for the use of this observation scale it was possible to collect quantitative data on SEAM behaviours.

This scale was then used within a procedure in which selected intervals of DMP sessions with ASD participants were observed in retrospect and annotated.

The participants' individual profiles showed an increase of levels for the separate SEAM markers and an overall increase of the number of SEAM markers that could be recognised in the interpersonal movement actions.

In contrast to other movement observation tools that are used for movement profiling in DMP, the movement markers obtained here covered not only individual movement qualities but also their interpersonal content. The item *individual weight engagement* however, is an exception to the interpersonal characteristics of the SEAM categories.

The item was kept in the observation scale because it occurred in all observed therapies before the participant developed towards weight engagement with a partner or weight regulation with a partner. The individual weight engagement often occurred in a sudden (in many cases impulsive, not regulated manner). The therapist was immediately engaged in these movement situation, because she had to make sure the participant was safe and not getting injured in the sudden poorly regulated weight engagement. From this experiential perspective the activation of weight, even if it is not yet actively directed towards the partner or the shared movement situation can be considered a precursor of weight engagement and weight regulation with partner. The unregulated individual weight may also bear a reference to very early dyadic patterns in which the caregiver contains and regulates the child's weight, as the child is not yet able to actively engage and contain its own weight.

Within the interaction dynamics of the movement situation SEAM behaviours occur as bodily or movement impulses between participant and therapist. The focus of the movers is on the shared movement actions and their shared attention to a shared movement activity. The information about the changes in the moving dyadic attunement has an embodied quality and a shared focus of attention, therefore it is not a kind of information that is external to the moving dyad. By acting accordingly, the therapist addresses early levels of dyadic relating, from which the child develops and articulates its individual needs within the interpersonal relation.

Subsequently the interaction develops through movement experiences towards intersubjective attunement.

9.3.2 Findings from Research Step 2

In this study the focus was on the specific aspects of the DMP intervention with ASD participants. The contents analysis of the therapist's actions yielded a description of the shared movement approach as an improvisation based DMP method. Here the interpersonal movement aspects of the SEAM markers can be taken as cues for interpersonal relating within the improvised behaviours of the therapist.

Departing from open coding, the contents of the therapist's behaviours were analysed in terms of the underlying structural aspects. This resulted in a formulation of organising themes and of basic actions of the therapist.

The intervention was characterised as Shared Movement Approach (SMA), an improvisational DMP method, which, within the embedding of institutional structures and session structures, addresses SEAM development.

The core of this approach is improvisational kinaesthetic partnering, during which the therapist uses the SEAM markers as cues to tailor her movement actions to the development of interpersonal relating from the personal and specific movement potentials of a participant.

The structures that were found in the contents analysis of DMP with ASD's reflected to a certain extent the professional practice that is described by colleagues in the field. However, an equivalent to the relational modes presented in this study has not been found in the literature. The DMP intervention most frequently described in therapies with ASDs is that of mirroring. This technique has been used by many DMPs after Janet Adler explicated the use of mirroring in the therapy with children with autism (Adler, 1968a). Other authors describe variations to this technique. Eberhard-Kaechele (2012) defined *modalities of mirroring* as a developmental scale of relational modes, which are not all bound to strict mirroring. The

methodological approach with these modalities is that of an active therapist, who presents the client with movement exercises and situations that should bring about the experiences of the various mirroring modalities. Koch et al. (2014) referred to these mirroring modalities in their DMP intervention for young adults with ASD. Tortora (2009) describes variations of mirroring in het DMP approach with young children with ASD. She differentiates between the therapist's attitudes of *attunement* and *mirroring*. The movement material that is at stake during the intervention is based on the movement patterns of the participating child. Loman (1995) differentiates between attunement and adjustment, which she links to the movement aspects *tension flow* and *shape flow* respectively. In her approach the child's movement material is scrutinised on the developmental phase it represents. The therapist will adjust her intervention according to this developmental stage, in search for moments of contact and relating.

The qualification of SMA as an improvisational dance movement access to kinaesthetic partnering, and thus interpersonal relating, situates this therapy approach in the range of dance-informed methods, rather than among methods based on psychological theories of dysfunction or pathology. The participant is considered a partner in dance rather than a patient, which introduces an intersubjective and mutually created relation, right from the start.

9.3.3 Findings from Research Step 3

The primary question for this research step was if the SEAM movement categories that had been found in retrospective analysis of DMP were also suitable for observation by different raters, who, unlike the present author in research step 2, were not experientially informed about the therapy context.

The SEAM observation scale was tested for the use by multiple raters and with different procedures for video-based observation of interpersonal relating behaviours of ASD participants during DMP.

The SEAM categories were tested for two different annotation procedures. In a sequential procedure SEAM behaviours were followed contingently with annotations in the ELAN software. In the interval procedure SEAM behaviours were indicated as present or absent within a set time frame with annotations in an observation sheet. Interrater agreement on the SEAM categories gave most satisfactory results when used with the interval procedure.

Training procedures for raters were initially based on relevant literature (Lausberg, 2013; Koch et al., 2001; Bräuninger & Zueger, 2007) and then tailored according to the raters' comments and the present researcher's observations during training sessions.

For this research the primary interest was if various raters would agree on the content of the SEAM observation categories. When differences among raters occurred, these were checked through microanalysis of raters' annotation behaviours. Within the group of raters differences in annotation of synchronisation behaviours were found for one rater throughout all observations. From microanalysis it showed that these differences were consistent between this rater's and the other raters' annotation behaviour. Her within rater annotation behaviour was in that sense reliable.

Variations of raters' annotations had been addressed as far as possible on beforehand. During training sessions it was observed that raters repeatedly went back to their own movement experiences to clarify the contents of an annotation category in case of uncertainties. Raters commented that the experiential calibration seemed to deliver a stronger consistency in their understanding of the SEAM categories.

The annotation procedures and characteristics of the SEAM categories were described in the movement rater's manual. The procedures and categories were further specified according to the comments of participating raters.

9.3.4 Findings from Research Step 4

The initial aim of this study was to investigate the feasibility and efficacy of the SEAM observation scale and of the SMA (shared movement approach) for the clinical setting.
In a protocolled pilot study the outcome of the SMA method used in the outpatient treatment with ASD participants could be replicated in a series of four cases. Outcome was measured in profiles taken from SEAM observations and from outcome evaluation with standardised measurement instruments.

The SMA intervention and the SEAM observation that had been described as results from research step 1 and 2 were applied within the existing clinical therapy structure of a Dutch mental health outpatient setting.
Clinical evidence for change has been shown in symptom reduction as documented through pre-post therapy changes in SEAM behaviours and in the outcome of social questionnaires.

The analysis of SEAM markers showed that the interpersonal movement behaviours in adolescents with ASD developed throughout therapy along patterns similar to those that had been observed in the retrospective analysis of successful DMP interventions of Study 1. Both studies showed that not only the occurrence of attunement behaviour in itself was significant, but also the relation between these occurrences over time.

Pre – post intervention analysis showed inversely related results for the mean group measures. For the SEAM markers within the single categories as well as within the clusters *orienting, engaging* and *regulating* movement behaviours, the group means showed an increase whereas mean group results pre-post intervention showed a decrease of social and somatic problems on the social questionnaires. The individual participants' movement profiles did show some differences in the composition of the SEAM markers, with a trend for all profiles to develop from spatial qualities towards the integration of weight and time qualities in the course of the therapy.

The social questionnaires, unlike the SEAM observation scale, do not register observed movement behaviours. In this study the outcome measures of the questionnaires were taken as a reference for changes in social behaviours in the context of daily life as perceived by the participants and their parents.

The use of the SEAM observation scale in the interval annotation procedure has shown to be an easy to use tool. It may also be applicable to outcome monitoring of interpersonal relating of the participants, by the therapist per session or over the therapy process. For the sake of research it can also be used as a tool for microanalysis in a more detailed sequential observation.

With the outcome of this last research step the initial observations from research step 1 have been replicated on a case-by-case base (Chambless & Hollon, 1998). The effect of the SMA method on interpersonal relating behaviours in a specific clinical population was evaluated with multi-method outcome measures of SEAM observations and standardised questionnaires. Single case research is usually taken as within subject research (Yin, 1999). Generalisation from single cases can be achieved in two ways (Hartley, 2004). Findings can be aggregated towards group results, as has been done in this research step towards group

means of the outcome measures; or it can be shown through the replication of within subject results, which in this research step has been shown for the development of SEAM behaviours.

9.4 Discussion of the findings

Relating the above mentioned outcome to the initial research questions
we find that through the four research steps i) the retrospective analysis of DMP with ASD's yielded relevant measures for the changes in interpersonal engagement behaviours in participants with ASD, which resulted in the design of the SEAM observation scale as a tool to measure (changes in) interpersonal relating; ii) the retrospective analysis of DMP with ASD's yielded an improvisation-based DMP intervention that has been described as the Shared Movement Approach (SMA), which specifically aims at developing interpersonal relating behaviours in participants with ASD; iii) the interval rating procedure with the SEAM observation scale generated good agreement between movement raters and iv) that the outcome of SMA intervention with regard to the development of interpersonal relating behaviours could be replicated in a series of cases and the SEAM markers have shown suitable to monitor changes within interpersonal relating initiated by the ASD participant.

This research had an explorative, piloting approach towards the domain of interest. A series of research steps delivered predefined domain specific observables that enable an empirical analysis of specific characteristics and changes in interpersonal relating behaviours of participants with ASD throughout a SMA therapy. The replicated case studies covered the usual clinical practice of the Dutch outpatient setting. The procedures were found to generate empirical outcome for the SEAM observation scale as well as for the Shared

Movement Approach. The DMP intervention Shared Movement Approach delivered a significant improvement of interpersonal movement behaviours as measured through SEAM observations and social questionnaires.

This first exploration into the domain of movement specific outcome variables for interpersonal relating in participants with ASD after DMP intervention delivered the basis for further research on the effect of DMP on relational potentials in ASDs.

An important result for the clinical application of this research is the description of the DMP intervention. The dance-informed improvisational therapy method (SMA) is closely related to other improvisational methods that are investigated in the field of dance research (Ribeira & Fonseco, 2011; Sutton, 2005; Legrand & Ravn, 2009; Hagendoorn, 2002). A cross-fertilisation between art based and therapy based research procedures may further support dance-informed conceptualisation of the DMP methodology.

Clarity about the methodological framework for the DMP intervention is an exigency not only for DMP research but also for the implementation in the mental health professional field. Also therapy conduct and communication with participants might profit form clear methodological guidelines on how to conduct the intervention. Thus, we found that rather similar outcomes were obtained in the therapies of Study 1, which were conducted before the start of the project, as in those of Study 4, conducted during the project, in which treatments were based on a (by that time) clearly delineated method (SMA). The latter only took some 3 ½ months (12 sessions), whereas the former covered approximately 8 months. Nevertheless, the outcome profiles of the SEAM analysis show comparable results for the two groups.

This research contributes to (body-informed) routine outcome monitoring (ROM). The SEAM observation scales measure behaviours in the domain that is addressed by the intervention. Study 3 has shown the suitability of the instrument for multiple users and Study

4 has shown a first correlation of SEAM outcome with that of standardised measurement instruments that cover similar areas of interest.

9.4.1 Kinaesthetically informed research perspective

The chosen research path contributes to an understanding of interpersonal engagement in ASD, in that it offers a kinaesthetically informed perspective, from which the interplay of interpersonal relating can been described in terms of orienting, engaging and regulating movement behaviours.

The retrospective analysis of positively evaluated therapies yielded operational markers of interpersonal attunement, which corresponded to the initially formulated outcome evaluations of parents and caregivers on the effects of DMP on the interpersonal relating behaviours of their ASD children. These components, which had been described in terms of movement markers, when related to concepts reviewed from the existing literature on interpersonal attunement (Stern, 2002; Gallese, 2006; Trevarthen, 1998), help to refine our understanding of attunement. For, from a movement perspective, attunement can be considered as the interplay of several directly observable behavioural components.

INTERPERSONAL ATTUNEMENT is composed through of movement aspects, which can be related to the overarching themes of space, weight and time:		
interpersonal **ORIENTING**	as seen in use of spatial aspects	- facial orientation - body/body part orientation - movement direction
interpersonal **ENGAGEMENT**	as seen in use of weight aspects	- weight engagement during individual action (precursor) - weight engagement with partner - weight regulation with partner
interpersonal **REGULATION**	as seen in use of time aspects	- synchronisation in rhythm - synchronisation in phrase

Table 14: Movement components of interpersonal attunement

All these behaviours stem from early forms of dyadic relating, but also form an undercurrent in every human communication and interaction. This kinaesthetic perspective broadens the focus on dyadic interactions with a more experientially and action related frame of reference (Sheets-Johnstone, 1999).

Social orienting focussed for a long time on eye-contact (eye and facial tracking) and face-processing (Moody, McIntosh, Mann & Weisser, 2007; Johnson, 2014). Social engagement focussed on the early capacities to imitate another person as a base of empathetic understanding of others and joint attention (Meltzoff & Gopnik, 1993; Rogers et al., 2003).

A kinaesthetically informed perspective, however, enables a broader understanding of interpersonal attunement in that it not only considers individual movement patterns such as changes in tension flow or shape flow (Kestenberg, 1975; Loman & Foley, 2003), but also takes into account the movement patterns shared between movers. To a certain extent, with respect to the interactions in the early dyad, these behaviours have been implicitely described by many authors (Beebe & Lachmann, 2003; Kestenberg, 1975; Trevarthen & Aitken, 2001; Stern, 2002).

The conceptualisation of kinaesthetically informed interpersonal attunement that is presented here, can be related to enactive approaches to DMP (Fishman, 2009; Koch & Fishman, 2011) and to enactive approaches to the social development in ASD (Klin, Jones, Schultz & Volkmar, 2003; De Jaegher, 2013). An enactive perspective takes the shared interpersonal actions and concomitantly the pre-conceptual forms of relating as vital components in a theory of self-other engagement. As a specific form of movement analysis, SEAM observation covers the analysis of the dyadic relational patterns. SMA as a DMP method specifically aims at the development of interpersonal orienting, engaging and regulating and it can connect to patterns of interpersonal relating that stem from early

developmental phases. Such analysis can be made without triggering any regression in the participant to some early relational states, because the participant's SEAM movement capacities are addressed within the actual situatedness of the shared movement experience.

In the development of the therapeutic relation the presence (or absence) of the individual SEAM movement behaviours are relevant as well as the changes over time in their constellation.

The research path of this project has been informed by the researcher's experiences as a therapist. In the SMA intervention that has been described as a result of Study 2 the therapist actively seeks to connect to the movement experiences of the participant.

The researcher's/therapist's bodily perceptions have been considered a relevant source of information upon the shared movement situation; they are not put aside as being too subjective. Instead, their subjectivity is the therapist's major vehicle of information. In their kinaesthetic structure they carry the information from and about the co-created movement situation.

The therapist's notion of what happens in the shared movement situation may be considered as a noetic bodily feeling (Colombetti & Ratcliffe, 2012), where 'noetic' is understood in a Heideggerian sense as a lived experience, in which thinking and being are intertwined.
The reflexive body subject (Merleau-Ponty, 1962) of the therapist knows through direct kinaesthetic perception about the changes in the embodied constellations within the shared movement situation.

The DMP therapist contributes to the therapeutic relation through her own kinaesthetically informed experiences in interpersonal relating behaviours while at the same time she is

kinaesthetically informed about the relating behaviours of the participant as well as about her own responses to the movements of the participant. The kinaesthetic perceptions inform her noetic understanding and her direct responsivity to the actions of the participant in the shared relational context, without (narrative) interpretations or pre-set expectations.

The SEAM markers can support the therapist to analyse the participants' movement behaviours with regard to interpersonal relating. Taken as cues during the improvisation, they enable the therapist to tailor her movement actions to those of the participant.
The actions of the participant are contained (cf. Bion, 1962) by the kinaesthetically informed movement answers of the therapist. Through her actions she seeks to provide an environment of affordances for interpersonal movement behaviour (Friston, 2013; Rietveld & Kiverstein, 2014; Hellendoorn, 2014).

Dance therapy is an artistic discipline. The participant is encountered as a dance partner, not as a substrate of pathological functioning. The dance therapy situation in the shared movement approach is eventually oriented to and inspired by the perspective of a shared movement or dance, mutually constructed between therapist and participant, that is: the construction of a(n) (kin-)aesthetic object. This embeddedness is bidirectional: the dance is both an object of perception and it is the locus from which both therapist and participant perceive and experience. This is in line with Gadamer's (1977) discussion of 'play' as a newly emerging locus of shared subjective experience.

From the beginning the therapist searches to invoke activities that will enable the participant to become a contributing dance partner. The interpersonal relating behaviours in participants with ASD have shown significant improvement on within subject measures. The findings from social neuro-science suggest that changes in the movement behaviour over time would lead to changes in the activation of the pre-motor area's in the brain, especially the putative

mirror neuron system (Gallese, Rochat, Cossu & Sinigaglia, 2009; Homann, 2010). Although no study yet addressed the impact of movement experiences on the pre-motor brain structures in ASD's, there are studies that support the brain functioning's sensitivity to experiential impact (Libero, Stevens & Kana, 2014). After studies had shown diminished activation of the mirror neuron areas in children with ASD (Dapretto et al., 2006) the "broken mirror hypothesis" (Ramachandran & Oberman, 2006) was put forward as a potential explanation for the ASD specific features in social relating. Bastiaansen et al. (2011) have shown that the activation of pre-motor area's in adults with ASD is even stronger than in neuro-typicals. The development of the brain as an organ is a close synergy of genetic disposition, maturation and experiential development. Further research might deliver new insights on the impact of changes in interpersonal movement behaviours on the social brain circuits for neuro-typical development as well as for ASD development (Karpati, Giacosa, Foster, Penhune & Hyde, 2015).

The relational modes and movement actions that have been described for the therapist in the SMA intervention may be considered as interactional tools that are instruments both for the therapist (in action) and for the researcher (observing the therapeutic performance). Far more difficult than this recognition is the empirical observation of the therapist's intentionality (i.e., her focus upon the participant's intentionality) that takes shape through these steps. Nevertheless, we can empirically see a contingency between increases in the complexity of therapeutic performance, especially towards more movement dialogues and less mirroring, on the one hand, and on the other hand increases of the participant's SEAM movement actions. The therapeutic approach that has been described is one in which steps are performed that progressively address the participant and enable him to respond and join the dance.

To this purpose the therapist works from the relational modes [witnessing, joint movement and movement dialogue], which can be specified in her movement behaviours, but it should be emphasised that they focus upon the SEAM behaviours and the facilitation of a dance response on the part of the participant.

The dance is the consensual instrument and platform through which and by which the participant can develop a kinaesthetic perception and self-other-relatedness. This intentionality on the part of the participant as well as the intentionality of the therapist cannot be formulated in terms of a strict procedure or protocol nor in terms of a fixed set of techniques, although the activities performed by the therapist can always be interpreted and recognised in terms of relational modes and movement activities as has been described in Study 2.

The relational modes and movement activities that have been described in Study 2 are used by the therapist within an intentional attitude towards an intersubjective encounter with the participant. They are not the building blocks by means of which a participant automatically transforms into a dancing subject. Rather, they enable the therapist to attune to the participant; and through kinaesthetic partnering in the improvised structures of the shared movement approach they engage the participants in their pre-reflexive relating capacities.

The improvisational approach is what distinguishes the SMA from other manualised DMP approaches (for ASD's) that use pre-defined working modes and movement activities. Koch et al. (2014) used specific movement activities to promote empathy with young adults with ASD. Hartshorn et al. (2001) used a structured approach that offered specific movement experiences for children with ASD. The improvisational approach seeks to arrange the movement situation in a way that interpersonal impulses can develop from the situated

context, whereas the other approaches address the envisaged behaviour through exercises or activities.

The therapeutic approach of SMA is explicitly developmental in that it aims to offer a setting that stimulates experiences and impulses for interpersonal relating behaviours.
The therapeutic attitude in this is not solely one of following the child's behaviour, but more one of providing situations that invite towards development of interpersonal relatedness. This type of developmentally oriented psychotherapy has been described since the 1980's and has influenced the dyadic developmental therapy (Becker-Weidmann, 2008; Guidano (1987). Alvarez (1999) also used such a developmental approach in her analytic therapies with children with ASD.

In the SMA approach the movement activities that the therapist brings to the shared movement situation are considered as affording behaviours on the part of the therapist. The therapist departs from a technically therapeutic mode of kinaesthetic reflexivity and, through her movement contribution, intends to reframe the ongoing interaction with the participant into a (kin)aesthetic partnering interaction.

The development of a dialogic movement becomes visible through the development of SEAM movement patterns within the shared space of the therapeutic relation and setting. This shared space is understood in terms of Winnicott's (1971) concept of a 'potential space', or in terms of Gallese's (2006) 'we-space', or in terms of Merleau-Ponty's (1962) notion of the space 'in between' or 'corporeity'. These conceptualisations are not identical, but they all express the idea of an upcoming space of new phenomena within an interaction, therapeutic or otherwise. Accordingly, dance can be such a shared space in which new events and new interpersonal experiences can emerge. In the course of the emergence of these events, the

participant's intentional behaviours can become more visible and sensible to those involved in the dance.

Through the improvisatory approach to the therapy process a phenomenon of origination and Gestaltung (formation) of interpersonal subjectivity comes into the therapy process. This development can be recognised subjectively by those involved as well as by responsive observers. It takes intentionality towards the interpersonal shared movement behaviours to recognise the interpersonal intentionality of the involved movers. However, it would be a mistake to stratify the rise of the participant's intentionality in terms of a behavioural protocol. On the other hand, once intentionality in the participant can be understood through movement markers as has been elaborated in Study 1, it can to some degree be subjected to regular measurement procedures as has been shown through the SEAM observations.

The process of formation in DMP has to be considered. The therapist and the participant are through their embodied presence both part of the process (Samaritter, 1994). The notion about the qualities of interpersonal relating is formed through enactive participation (De Jaegher & Di Paolo, 2007) and the outcome of this process is the embodied experience of these qualities of relating. The reflexive knowledge is embodied knowledge from within the shared movement space (Shotter, 2010).

This process has been paralleled throughout Studies 1, 2 and 3. In Studies 1 and 2 the experiential knowledge or intuitive experience (Petitmengin-Peugeot, 1999) of the therapist was taken as a point of departure for the contents analysis of the DMP session with ASD participants. In Study 3 the movement raters initially came from an excentric position (Plessner, 1975) in that they did not participate in the initial experiential domain. The movement experiences during the raters' training sessions contributed to a kinaesthetically

informed position regarding the behaviours of interest for the observation, without loosing their eccentric position with reference to the domain of research, the therapeutic situation.

Although it has not been the initial focus of this research, the chosen path also contributed to an exploration of the validity of the obtained SEAM observation scale. Study 3 showed a consistent recognition of the interpersonal character of observed SEAM behaviours by several observers, and this may be taken as an indicator of their face-validity, as described by Cruz & Feder (2013) and Cruz & Koch (2004). Another form of face validity was found accidentally during the follow-up evaluations with participants, parents and case managers after treatment termination, when they recognised several meaningful shifts and changes of movement behaviours between participating child and therapist in some presented therapy vignettes.

The recognition of the specific content of SEAM categories in movement behaviours (as well as through movement experiences and through observation experiences) by other expert observers contributed to the validity of the content of the SEAM scales defined after Study 1. In Study 4 the SEAM observation scale was tested against other, standardised and domain specific, measurement instruments in order to find correlating outcomes. The movement informed construct of interpersonal relating behaviours did seem to cover some relevant features in the domain of social relating, and this further supported the construct validity of the SEAM scale.

9.4 Limitations and suggestions for further research

Limitations within the single research steps have been addressed above in the chapters on the single studies. At this place the overarching points will be discussed.

The small number of cases involved in this research requires to regard the obtained results with caution. Due to some features of the institutional setting in which this research was situated, we had to be satisfied with a relatively small number of participants. The initial expectation with regard to the number of participants could not be met, due to changes in the institution's organisation of the so-called health care trajectories.

As this was a first exploration into the domain, it seemed prudent to work with replication design of single cases within the ASD population, future research might search to extend the findings form this research to a larger population.
The research focus has been limited to the movement behaviours of the ASD participants; further research could investigate whether SEAM development would be similar in children with a more typical development. Accordingly, it remains open to further research how the increase and the evolving constellation of SEAM behaviours in the ASD population would compare to a more neuro-typical occurrence of SEAM behaviours.

A next research step might involve a replication within a larger group and a comparison of SMA with other types of intervention with ASD participants that are also oriented upon interpersonal relating behaviours.

The specific developmental pathways of interpersonal movement behaviours have not been investigated in depth within the current research, but they might be of interest for further studies. In most cases *weight engagement with a partner* and *weight regulation with a partner* seemed

to occur throughout the therapy process prior to synchronisation with the time patterns of a partner. This might be a specific developmental feature for the ASD participants as none of them used synchronisation behaviours in the beginning of the therapy. There might be specific constellations and developmental pathways in the emergence of SEAM behaviours. Two raters i.e. described in their comments a tendency to look for recurring combinations of movement categories. They found it helpful for the annotation process to look for clusters of behaviour and they built their annotations from these co-occurrences. The coupling of *weight regulation* was repeatedly felt as being related to *synchronisation in phrasing*.

Another limiting aspect of this research was the fact that the research was situated in the researcher's own clinical work setting. Although for this project we found that the experiential information of the therapist, qua researcher, did contribute to an informed research path, a future replication of the outcome of SMA as well as the outcome of SEAM observation procedures would be desirable in order to see if the present findings can be confirmed with other therapists that do not also act as researchers.

The interval annotation procedure that was used during this study collected information about the presence or absence of SEAM behaviours within a certain time frame. Sequential annotations on duration and frequency of (single) SEAM markers could yield more detailed information and might be of interest for research into specific details of interpersonal relating behaviours within the context of shared movement activities. One potential subject for further research evolved in the course of this project. From the observations on the specific development of successive sequencing of individual movement markers, questions came up whether *individual weight engagement* can be found as a precursor to *weight engagement with a partner*, or the development of *weight regulation with a partner* as a precursor to the development of *synchronisation in rhythm or phrasing*.

The relation of SEAM markers with other movement observation tools has not been subject of this research. Further research might investigate the compatibility of concepts of the various movement analysis instruments. Some parallels may be found between the observations of this project and the tension flow rhythms and shape flow rhythms that are the core of the KMP. Also a comparison might be interesting between the SEAM markers found in this research and other behavioural markers that have been specifically developed for the movement observation with ASD participants or that have been specifically developed to investigate systemic interactions, like the BRIAC and the Movement Assessment of Families.

A correspondence of SEAM behaviours of the participant with actions of the therapist has been explored briefly in the preparation of the rater training sessions. A brief analysis showed closely related behaviours; especially those phases in which joint movement was predominant yielded a poor differentiation between behaviours of the therapist and behaviours of the participant. However, a specific sequencing of interlacing SEAM behaviours between therapist and participant might be helpful for a further specification of the SMA movement interventions and putative correspondences of SEAM behaviours between therapist and participant.

Another contextual aspect was the impact of the video camera on the therapy situation. Older adolescents seemed to be more aware of the 'extra observer'; they also commented during the informed consent procedure that they found it important to be ascertained that only researchers would have access to the tapes. The information that all (video) data would be used anonymously seemed to make video registration acceptable to them. Younger adolescents did not specifically raise questions about this issue.

During the sessions some of the participants addressed their movements to the camera, as if they were mirroring their own movements through the lens. This behaviour possibly occurred when the child began to become aware of their movement actions within the improvisation with another dancer. The therapist reported in her field notes that this mirroring through the camera lens seemed to be a precursor of directing movements towards the partner. This could be an interesting phenomenon for further research. The mirroring of movement through film or wall mirrors may lead to a reduction of (social) stimuli, which, as a result, facilitates the participant to address his movements towards other persons. This seems related to a phenomenon found in the interaction with humanoid robots (Robins et al., 2005), where (social) stimulus reduction seems to play an important role as well.

Another perspective for further research rose during the outcome evaluation post intervention with participants and their parents. Participants and parents commented vividly on video vignettes from the therapy. The recognition of SEAM behaviours as well as the recognition of changes in SEAM behaviours throughout therapy seemed to contribute to self-reflexive comments on the effects of the DMP intervention. A participatory research model in which participants are invited to actively contribute, from their own perspectives, to the research methodology and the procedures, would offer interesting opportunities to the ASD participants to elaborate their own perspectives on their kinaesthetic experiences during shared movement activities. An example for this is Participant 1 from Study 1 who commented on her own SEAM behaviour when watching video-vignettes at different moments of a DMP. She found herself having developed from moving more 'on herself' towards moving more 'together'.

Within this research no specific attention has been given to the various culturally determined colours and representations that may be assigned to dance and movement as embodied

practices. The movement repertoire that was taken into account for the movement observations was limited to improvisational movement, and no phases of pre-defined movement games or gestural interaction were selected for the video-vignettes. All participants as well as the therapist and the movement observers came from a western European background and movement culture. In the field of autism research no study was found that considered sociocultural differences in movement-behaviours in children and adolescents with ASD.

9.5 Concluding remarks

The contribution to knowledge from this research may be considered as follows.
The research contributed to clinical practice in i) the specification of applicable movement markers for outcome evaluation of DMP intervention in ASD, and ii) the specification of therapeutic interventions, which are clinically relevant in that they can be shown to effectively support ASD participants' impulses to attune and engage in shared movement patterns. The research contributed to a theoretical specification of social attunement in terms of interpersonal movement dynamics. The movement informed vocabulary may contribute to theory building on effective DMP interventions.

This research has been situated in a natural setting of DMP interventions. In contrast to laboratory studies, a natural setting includes all dynamics that occur in the course of a therapy process. Clinical studies on therapy cases therefore do not produce outcomes as clear-cut as would do a lab-study. On the other hand, it is this embeddedness in the natural setting that makes the findings specifically relevant for the clinical context.

The procedures for the SEAM observation scale as well as for the SMA intervention have been formatted into didactic modules, on the occasions of the interrater training sessions and the workshops with expert movers, which facilitates a transfer into DMP training programmes.

"There are many applications for dance improvisation in our culture, including therapeutic, self-expressive, social, artistic, and spiritual. Sometimes the differences among applications are clear-cut…. On closer examination, the lines quickly blur…." (Buckwalter, 2010).

This research left a deep trace in the experience of the dancing quality of interpersonal relating within all who were involved. The researcher experienced in the dancing dyad the vitalising joy of relatedness without pathologizing. Movement analysts expressed their surprise about the relating and dancing capacities of the participating children and adolescents, who no longer were formatted according to a diagnosis, but who were seen in their personal ways and capacities of relating.
Participants and parents expressed their contentment and joy about the (newly) found communicative expressiveness.

Thinking from the body

Giving attention to perceptions

Perceiving while moving while perceiving

Sequencing towards

Immediate connectivity

Extending the border of the living system beyond the own body boundaries

Patterns of shared rhythms and spaces

Dancing bodies – thinking bodies dancing

Writing from moving

My contribution from embodied understanding

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Appendices

Appendix 1: Ethics approval METC
d.d. 2 July, 2013, reference: CEC number 13-N75

Appendix 2: Translation letter site, process manager
d.d. 23. September 2013, reference: MM/MCr 13.154

Appendix 2A: Original letter site, process manager
d.d. 23. September 2013, reference: MM/MCr 13.154

Appendix 3: Translation letter site, Board of directors
d.d. 24 september 2013, reference: CS-13.0121

Appendix 3A: Original letter site, Board of directors
d.d. 24 september 2013, reference: CS-13.0121

Note:
The appendices 1 to 3A have been removed from the public version of this thesis for reasons of privacy of the corresponding parties. All letters have been available for consultation to the supervisors, the ethics committees and the examiners only throughout the various stages of this project.

Appendix 4: Consent form child

Translation informed consent form

Title of the study:
Inside the mirror: Pilot study on the effects of dance therapy interventions on the non-verbal interpersonal attunement in children with an autism spectrum disorder.

Translation of the **Consent form (child)**

Title of the study:
Inside the mirror: Pilot study on the effects of dance therapy interventions on the non-verbal interpersonal attunement in children with an autism spectrum disorder.

The aim and the procedures of the study in which I have been asked to participate have been explained to me by Mrs. R. Samaritter.

I have read and understood the information letter. I have been informed about possible risks and discomforts that might arise from participating in this study.

I understand that participating in this study is voluntary. I have the right to withdraw my consent at any time, without giving a reason for doing so. If I decide to withdraw, this will have no influence at all for the further counselling/DMT.

I agree with consultation of my personal file by co-workers in this study, by the medical ethical commission and the legal authorities to control the procedures and content of this study under the condition that the confidentiality of my file will be guaranteed/warranted.

I give my consent to participate in this study out of my own free will.

Name:

Signature

Date:

The undersigned declares to have informed the person(s) mention above in writing as well as in speaking about the aforementioned study. It is also declared that I have answered all questions to my best knowledge. I declare that a decision to withdraw from the study will not have any consequences for the further counselling/DMT and care for the child.

Name therapist/researcher:

Signature:

Date:

Appendix 4A: Information letter child & parent

Title of the study:
Inside the mirror: Pilot study on the effects of dance therapy interventions on the non-verbal interpersonal attunement in children with an autism spectrum disorder.

Translated version of the Information letter adolescents & parents

---

Welcome/Dear……..

Your case-manager has asked you whether you would consider participating in a scientific study entitled:
Inside the mirror: Pilot study on the effects of dance therapy interventions on the non-verbal interpersonal attunement in children with an autism spectrum disorder.

At ORBIS mental health care dance movement therapy (DMT) has since long be offered to young people with autism spectrum disorders. Adolescents who have followed this therapy were usually satisfied with the results.

Aim of the study:
We would like to know more about how this therapy works. We would like to see if there are any changes in the way of moving and relating after following therapy.
At ORBIS mental health a research will be conducted in collaboration with the University of Hertfordshire in the United Kingdom.

Want to participate in research?
Young people between 12 to 18 years with autism spectrum disorders who have been referred to DMT may participate in the research study.
This letter will tell you what you will be doing if you decide to participate in this study.

What are you going to do?
Before the start of the project you and your parents, together with your case-manager will have an introductory meeting with the therapist and researcher, Mrs Rosemarie Samaritter.

Rosemarie Samaritter

During this meeting, she will give information about the research and you can ask any questions you have.
Two weeks after this meeting, the researcher will contact you by phone to answer any further questions you might have and to ask if you want to participate in the project. If you wish to participate she will also make an appointment for you and your parents to sign a consent form.
It is important to know that you can stop your participation in the project at any time. This will have no effect for your counselling.

Design of the study:
In this study young people between 12 and 18 years can participate, who have a form of autism and who have been referred to dance movement therapy. We will work together in 12 therapy sessions in the movement therapy room. All therapy sessions will be video-recorded. Afterwards recordings will be used for observations of you and the therapist moving together.

At the start and at the end of the therapy we would like to observe how you usually move. You will meet with the therapist in the movement room. She will invite you into a number of movement activities. These movement activities will also be video-recorded. The recordings will be used to observe your personal way of moving.

When all adolescents who participate in this study have finished their therapy, the movement observations will be worked out. It will take about one year before all the observations will be completed.


the movement space

Advantages and disadvantages for the participants:
Advantage: With your participation in this study you help us to tailor the therapy even better and to investigate the outcome of DMT for future adolescents participating.
There are no disadvantages expected from participating in this research, you just follow your treatment as you would normally do. The only difference with the usual therapy trajectory is that the session will be video-recorded and you as well as your parents will be asked to fill out a questionnaire at the start and at the end of the therapy.

Risks and side effects:
There are no risks involved in participating in DMT.

Voluntary participation:
Participation in this study is completely voluntary. If you do not wish to participate there is no reason to sign up. If you decide not to participate, this will have in no way an impact on your counselling/ DMT participation at ORBIS. Even if you have given your consent to participate, you can withdraw at any time from the project without giving reasons. If you want to stop you can do so at any time during the therapy process.

Confidentiality:
All personal data from this study are confidential. Your personal data will not be shown to anyone. Data collected for this study may only be accessed by people who are authorised to do so only after you and your parents have given permission to do so. These persons might be members of the research team, employees of the Health Inspectorate and members of the Medical Ethical Committee of ORBIS / Atrium. The inspection may want to make sure that the

research has been conducted in good order. All personal information will be removed from the material that will be used for the research; a code number will replace it, so researchers will not know who you are or why you came into therapy.

Approval:
This research has been approved by the management of ORBIS GGZ and the Board of Directors of ORBIS. The Medical Ethical Review Board of ORBIS/Atrium has given approval to conduct this research.

Further questions?
In case you have any further questions that you wish to put forward, you can contact the movement therapist and researcher Mrs. Rosemarie Samaritter, p: xxxxxxxxxx.

Thank you for taking the time and effort to read this information letter. We will be happy to answer any questions.

If you would like to participate you can let us know.

Best wishes,

Rosemarie Samaritter
(DMT, psychomotor therapist, researcher)

Appendix 5: Consent form parent

Title of the study:
Inside the mirror: Pilot study on the effects of dance therapy interventions on the non-verbal interpersonal attunement in children with an autism spectrum disorder.

Title of the study:
Pilot study on effects of dance therapy interventions on the non-verbal interpersonal attunement in children with an autism spectrum disorder.

The aim and the procedures of the study that my child and I have been asked to participate in have been explained to me by Mrs. R. Samaritter.

I have read and understood the information letter. I have been informed about possible risks and discomforts that might arise from participating in this study.

I understand that participating in this study is voluntary. I have the right to withdraw my consent at any time, without giving a reason for doing so. If I decide to withdraw, this will have no influence at all for the further counseling of my child.

I agree with consultation of my child's file by co-workers in this study, by the medical ethical commission and the legal authorities to control the procedures and content of this study under the condition that the confidentiality of my file will be guaranteed/warranted.

I give my consent to participate in this study out my own free will.

Name Mother: Name Father:

Signature

Date:

Undersigned declares to have informed the person(s) mentioned above in writing as well as in speaking about the aforementioned study. I declare that I have answered all questions to my best knowledge. I declare that a decision to withdraw from the study will not have any consequences for the further counseling and care for the child.

Name therapist/researcher:

Signature:

Date:

Appendix 5A: Information for parents given at start

Title of the study:
Inside the mirror: Pilot study on the effects of dance therapy interventions on the non-verbal interpersonal attunement in children with an autism spectrum disorder.

Translation of the
Information for parents regarding your child's participation in an outcome study on dance and movement therapy
as provided at start therapy field study

Your child has been referred to dance movement therapy. This therapy has been part of the treatment programme for adolescents with autism spectrum disorders with a normal IQ of ORBIS GGZ, department for child and youth, for many years. To tailor the treatment programme as close as possible to the needs of your child, we plan to research the outcome of this form of therapy. This will happen as part of a PhD trajectory of the researcher Rosemarie Samaritter (who is also acting in the role of dance movement therapist) at the University of Hertfordshire (UK). With this letter we wish to inform you about the research project and ask for your participation.

Dance movement therapy
Dance movement therapy (DMT) has shown some positive effects on the social behaviours of adolescents with ASD. In dance movement therapy the child is invited into diverse movement activities that aim at improving the child's non-verbal attunement towards his/her environment. During the therapy there will be shared movement activities, during which the therapist will regulate her interventions towards the needs of the participant, as well as free movement situations, where the participant may initiate shared movement activities or not.

Purpose of the study
This study will investigate whether the interpersonal relating of adolescents with ASD changes after participation in DMT when compared to beforehand. The outcome of the therapy will be evaluated through questionnaires and movement analysis. The findings of this study are intending to contribute to further adaptation of the dance movement therapy intervention.

What will participation in the study mean for you and your child?
Adolescents with an ASD age 12-18 years, who have been referred to DMT, may participate in this study. All participants will be informed in writing and in speaking about this project. If you and your child decide to participate in this study, the researcher and therapist, Mrs Rosemarie Samaritter will ask you and your child to sign a consent form.
It is important for you to know that you may withdraw from this project at any time. Withdrawal will have no negative consequences for the counselling of your child at ORBIS GGZ.

Design of the study:
At the start and at the end of the study your child will be invited into a free movement play situation. This free movement situation will take place within the regular therapy schedule of your child. These situations will be video recorded. Afterwards these recordings will be used for observation of the interpersonal movement behaviours of the child and the therapist.
As a parent you will be asked to complete two questionnaires before the start and at the end of the therapy. This will take about 30 minutes of your time.
The adolescents will follow dance movement therapy over a period of 12 weeks at ORBIS GGZ.
The weekly therapy session will last 45 minutes. The sessions will be video-recorded. The recordings of session 1, 4, 8 and 12 will be used for observation of the interpersonal movement behaviours of the child throughout therapy. All materials will be handled confidentially. The video-recordings will be destroyed after termination of the study. The only people to view the videotapes will be the movement analysts (who sign a confidentiality form, the researcher and her supervisor.

Storage of data and feedback on the outcome
Only persons who are legally qualified will consult the data of this study, solely after your and your child's permission. Co-workers of the research team will only be presented with anonymised information. At no time will they have access to the patient files of your child. Staff of the Inspectie voor de Gezondheidszorg and members of the Medisch Ethische Toetsingscommissie of Atrium/ORBIS may consult the research data to control the quality of the study.
After termination of the study the participants will be informed about the general outcome of the study via a personal letter.

All information that could lead to identification of a person will be removed from the data that will be used for the research. The files will be stored securely under anonymous codes. All the data that are not part of the patient's file will be destroyed after the termination of the study.

How can your child participate?
Participation in this study is completely voluntary. You and your child may at any moment decide to withdraw from the study. This will have no negative consequences for the counselling at ORBIS GGZ.
If you, with your child, choose to participate in this study would you please sign the consent form attached and send it to the address below.

In case you have any questions after reading this information, please feel free to contact the researcher, Mrs. Rosemarie Samaritter, phone xxxxxxxxxx (receptionist) and xxxxxxxxxx (administration department child and youth) or your case manager.

Best wishes,
Rosemarie Samaritter
(dance movement therapist, psycho motor therapist)

Orbis Medisch Centrum, afdeling kind en jeugd
t.a.v. Rosemarie Samaritter
xxxxxxxxxx
xxxxxxxxxx

e-mail: xxxxxxxxxx

Appendix 6: Consent form video registrations

Title of the study:
Inside the mirror: Pilot study on the effects of dance therapy interventions on the non-verbal interpersonal attunement in children with an autism spectrum disorder.

Translated version of the consent form video-registrations

Dear parents and dear participants in the movement therapy,

During the therapy session we would like to take video-recordings. We have experienced that it may be very helpful to watch back what is happening in the therapy sessions together with parents and participants. Sometimes it is also helpful to watch short vignettes during therapy.
We therefore ask for your consent to video-record during the therapy session. It is important to know that you may refuse to agree with recording in case you prefer not to. Participants who do not want to be videotaped will not be recorded.
If you would like to support us in making the work more visible for colleagues and interns you may indicate this in the checklist below. In these cases your privacy will always be safeguarded, no information about you or your therapy will be given. Without your consent the recordings will exclusively be used within your own therapy and counselling.
Again you do not have to give your consent in case you feel uncomfortable with the videotaping during therapy.

Best wishes,
Rosemarie Samaritter

……

Consent form video-recordings

I herewith agree YES/NO * with the video-recordings during the movement therapy sessions.
These recordings will be handled according to the privacy rules for patient files.
The recordings may solely be used to observe certain scenes during the therapy or during the counseling sessions with the parents.

Furthermore I agree with the use of the video-recordings for the purpose of
(please ONLY indicate what is applicable to your consent)

- consultation between co-workers at ORBIS GGZ ☐
- professional education/ training within ORBIS GGZ ☐
- professional education/training outside ORBIS GGZ ☐
- academic research on movement therapy ☐

I may withdraw my consent at any time.

Name participant:. . . . . .
Date of birth: . . . . . .

Mother: . . . . . .
Date of birth: . . . . . .

Father: . . . . . .
Date of birth: . . . . . .

Date: . . . . . .
Place . . . . . .

Appendix 7: Consent form movement analysts

Title of the study:
Inside the mirror: Pilot study on the effects of dance therapy interventions on the non-verbal social attunement of adolescents with autism spectrum disorders.

Translation of the
Informed consent movement analysts

The aim of this study and the procedures have been explained to me by Mrs. R. Samaritter

I have read understood the information on the project. I have been informed about any risks or discomfort that might arise from participation.

My participation as a movement analyst in this study is completely voluntary, I may withdraw my consent for participation in this study at any moment without the need to give any specific reasons.

I am aware that the data/video-materials are exclusively to access for the purpose of movement observations within this study. I will insure confidential handling of the material according to the privacy rules of the National Mental Health organisations. I have been informed that I will have to sign a privacy statement each time I will be handed a data file by the researcher.

I agree with the use of my movement analyses for the purpose of this study. Mrs Samaritter may use visual materials from the ELAN annotation in publications and presentation about this study under the condition that the anonymity of the movement analyst will be safeguarded.

I give this consent out my own free will.

Name:

Signature:

Date:

Undersigned declares that the above-mentioned person has been informed about the above-mentioned study in writing and speaking. I declare that I have answered all questions to my best knowledge. I declare that a withdrawal from the study will is possible at any time and will have no further consequences.

Name researcher:

Signature:

Date:

Appendix 8: Privacy statement movement analysts

Title of the study:
Inside the mirror: Pilot study on the effects of dance therapy interventions on the non-verbal interpersonal attunement in children with an autism spectrum disorder.

Translation of the
Confidentiality/Privacy statement for movement analysts

I herewith declare that I have received a data-stick with video-vignettes from Mrs. R. Samaritter for the purpose of movement analysis. I am aware that the material may be exclusively used for the purpose of movement observations within the research project "Inside the Mirror". I oblige myself to handle this material according to the privacy regulation of the Dutch Mental Health Organisations. Demonstration to third parties is prohibited. Use for other purposes than described above is prohibited. It is not allowed to copy the data files to other hardware. After finishing the observation I will return the materials to the researcher Mrs. R. Samaritter

Place:

Date:

Name:

Signature:

Confirmation of return:

Rosemarie Samaritter
PhD candidate University of Hertfordshire
School of Psychology

Appendix 9: Debriefing retrospective study

Title of the study:
Inside the mirror: Pilot study on the effects of dance therapy interventions on the non-verbal interpersonal attunement in children with an autism spectrum disorder.

Translation of the debriefing letter to the participants of the prospective field study

---

Dear parents, dear .....

Some time ago you had a dance therapy with Mrs. Samaritter.

By that time you have given your permission the make video registrations during the therapy, and you allowed me to use them for research on dance therapy with children and adolescents with autism.

This letter is to inform you about the outcomes of the research thus far.

Research question:

For this research some of the video registrations have been observed, with a focus on how in the course of the therapy the movement behaviours change when the participant moves together with the therapist.

Course of the research:

This research has helped to construct an observation scale of movement actions that contribute to the mutual attunement between two moving persons. Actions that are on this scale are for instance: looking at the other person, directing the movement towards the other person, have the physical effort attuned to the other person's movements, attuning pace and rhythm to the other person. Based on the observations it was our impression that the attunement between two moving persons evolves best if all of these qualities are involved.

For each participant it was investigated how the movement attunement with respect to a movement partner changes during therapy. It turned out that for all participants the movement attunement towards the other person had improved considerably at the end of the therapy.

For a follow-up study the observation scale of movement qualities for social attunement was applied and compared with a questionnaire on social attunement.

At this stage of the research a small group of adolescents has participated. For that reason, the present research does not yield conclusive evidence on the effects of dance therapy on the attunement behaviours of adolescents with some type of autism.

On the other hand, the observation list seems to be well applicable. It shows comparable outcomes when used by different observers.

These outcomes are very useful in further research on dance therapy.

In order to further underpin these outcomes, a research will be necessary with a larger group of participants. One of the recommendations based on the present research will be to repeat the investigation with a larger group of adolescents, allowing for more conclusions on the impact of the dance therapeutic intervention.

The outcomes of the present research will be documented in Mrs Samaritter's dissertation and perhaps also in a paper in a professional journal.

Thank you:

Thank you so much for your participation in this research. Scientific research plays a major role in developing well-tuned interventions and support for children and adolescents who experience developmental issues. Research has a major role in this. For that reason we highly appreciate your participation.

If this letter gives rise to any questions you are welcome to contact the secretariat of the department child & youth, ORBIS GGZ, tel. xxxxxxxxxx. We will be happy to schedule an appointment with you upon your request.

With kind regards,

Rosemarie Samaritter,

Senior dance therapist, psychomotor therapist

PhD student at University of Hertfordshire (UK)

Appendix 10: Debriefing field study

Title of the study:
Inside the mirror: Pilot study on the effects of dance therapy interventions on the non-verbal interpersonal attunement in children with an autism spectrum disorder.

Translation of the debriefing letter to the participants of the prospective field study

---

Dear parents, dear .....

Some time ago you participated in the research project "Inside the mirror" which was performed by Mrs Samaritter at the youth department of ORBIS GGZ.

At the time you have confirmed your willingness to participate in the research. You gave permission for registration of the therapy session on video. Before and after the therapy you have completed questionnaires.

This letter is to inform you about the outcomes of the research thus far.

Research question
In this research we wanted to explore which effects dance therapy has on the social attunement of the movement behaviours in adolescents with autism spectrum disorders.

Course of the research
The recordings of the therapy have been used to analyse the changes of movement patterns between therapist and participant. On the basis of these observations a list was composed of movements that were used by the adolescents when addressing other persons and attuning their movement behaviours with them.

Next, this list has been used for exploring whether the movement attunements between participant and therapist vary in the course of the therapy. An instance of attunement from the first session and one from the final session have been compared.
As a group average, it turned out that participants display more types of movements for attuning with the therapist after the therapy than they did before.

The questionnaires completed by the adolescents themselves were used to investigate how the participants assessed their own physical and social problems. As a group average, it turned out that participants reported to have less social problems after therapy than before. Also as a group average, participants reported to have less physical problems after therapy than before.

The questionnaires completed by the parents were used to investigate how parents assessed the physical and social problems of their children. As a group average, the questionnaires showed that parents saw their children to have less social problems after therapy than before. They also showed that, as a group average, parents saw their children to have less physical problems after therapy than before.

In this stage of the research project a small group of adolescents has participated. Many differences between participants have been found. For that reason, the present investigation does not yield conclusive evidence on the effects of dance therapy on the attunement behaviours of adolescents with some type of autism.

On the other hand, the observation scale does seem to be well applicable. It shows comparable outcomes when used by different observers.

These outcomes may be very useful for further research on dance therapy.

In order to further underpin these outcomes, a research with a larger group of participants will be necessary. One of the recommendations based on the present research will be to repeat the investigation with a larger group of adolescents, allowing for more conclusions on the impact of the dance therapeutic intervention.

The outcomes of the present research will be documented in Mrs. Samaritter's dissertation and perhaps also in a paper in a professional journal.

Thank you:
Thank you so much for your participation in this research.

The child and youth section of ORBIS GGZ seeks to offer well-tuned interventions and support for children and adolescents who experience developmental issues. Research has a major role in this. For that reason we highly appreciate your participation.

If this letter gives rise to any questions you are welcome to contact the secretariat of the department child & youth, tel. xxxxxxxxxx. We will be happy to schedule an appointment with you upon your request.

With kind regards,

Rosemarie Samaritter,
Senior dance therapist, psychomotor therapist
PhD student at University of Hertfordshire (UK)

Appendix 11: The social questionnaires

Questionnaires (forms)

The forms of the social questionnaires are copyrighted material and therefore have not been copied into the public version of this thesis. During the various states of the research process all forms have been made available for consultation for the supervisors, the ethics committees and examiners only.
For this study the Dutch version of the Child Behaviour Check List (CBCL), the Youth Self Report (YSR) and the Social Responsiveness Scale (SRS) have been used.
Forms are available from the publishers:

CBCL: Erasmus MC - Sophia Kinderziekenhuis Afdeling Kinder- en jeugdpsychiatrie Postbus 2060, 3000 CB Rotterdam; tel. 010 463 61 91; fax. 010 463 70 06; e-mail: info@aseba.nl

YSR: Erasmus MC - Sophia Kinderziekenhuis Afdeling Kinder- en jeugdpsychiatrie Postbus 2060, 3000 CB Rotterdam; tel. 010 463 61 91; fax. 010 463 70; 06 e-mail: info@aseba.nl

SRS: Roeyers, H., Thys, M., Druart, C., De Schryver, M. & Schittekatte, M. (2011). Screeningslijst voor autismespecturmstoornissen. Handleiding. Amsterdam: Hogrefe Uitgevers

Appendix 12: An example of the movement raters' manual

INSIDE THE MIRROR – pilot study MOVA - Rosemarie Samaritter

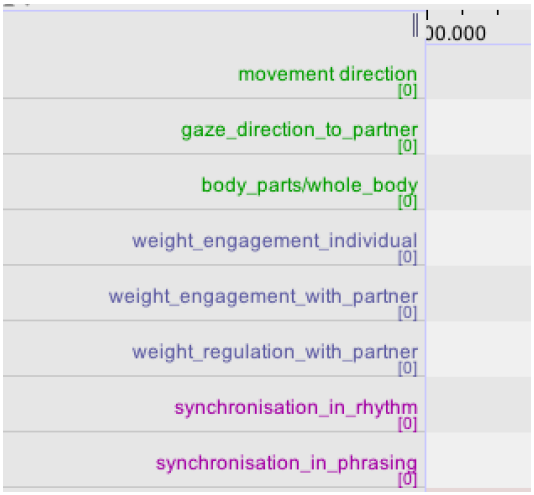
MOVA IV
Manual for movement analysts
(NL version, April 2014)

Handleiding voor bewegingsanalisten MOVA IV (NL versie, april 2014)

Beste bewegingsanalisten,
Dank voor jullie toezegging om mee te werken aan de annotaties van video-materiaal voor de deelstudie MOVA IV in het onderzoeksproject "Inside the Mirror". Jullie hebben inmiddels de informed consent getekend en je hebt een USB stick met data-files ontvangen. Dus we kunnen aan de slag!
In deze handleiding heb ik nog eens alle informatie samengesteld die je nodig hebt om de annotaties uit te voeren. Als er nog vragen rijzen kun je me altijd mailen (xxxxxxxxxx) of bellen (xxxxxxxxxx)
Voor de analyse in het deelproject MOVA IV worden de data uit de map "testset_2_gesorteerd" gebruikt. In deze map zijn alleen de files aanwezig die voor de betreffende rater (geradomiseerd) geselecteerd zijn. Dus op jouw stick staan alleen de files die jij gaat bewerken.
Er zijn door een defect aan de camera helaas een aantal files echt wazig – ik heb toch besloten deze erin te houden – naar mijn idee kan de relevante bewegingsinformatie er wel uitgehaald worden. In geval van twijfel kun je je natuurlijke indruk gebruiken voor het annoteren van het gedrag. Mocht je vanwege slechte beeldkwaliteit problemen ervaren met het annoteren, kun je met mij contact opnemen.
Alle video fragmenten duren 45 sec.

MOVA ANNOTATIE GROEPEN:

De annotatie groepen zijn n.a.v. jullie opmerkingen tijdens de interrater-dag een beetje aangepast.
Ze zien er nu zo uit:



Voor alle categorieën is het van belang dat je ALLEEN het bewegingsgedrag annoteert waarbij
de bewegingsactie van de deelnemer/het kind gericht is op de partner/therapeut.
Er zijn natuurlijk nog een heleboel andere bewegingsacties – maar die nemen wij niet mee in de annotaties.
Wij gaan in deze ronde alleen de sociaal oriënterende bewegingen annoteren. Dat zijn dus alle momenten waarin de beweger in zijn bewegen (intentioneel) gericht is op de ander. De bewegingscategorieën op de tiers geven de mogelijkheid om deze sociale oriëntatie in de bewegingsacties weer te geven.

Voor de categorie ruimtelijke orientatie/SPACE orientation:

1. **movement direction** – annoteer deze tier als de deelnemer zijn bewegingen actief richt naar de therapeut – 2 opties op de tier: towards/away

2. **facial orientation** – annoteer deze tier als de deelnemer het gezicht richt naar de therapeut - geen optie op de tier (na het selecteren klick je alleen "enter")

3. **direction body parts/whole body** – annoteer deze tier als de deelnemer delen van het lichaam of het hele lichaam richt naar de therapeut (of actief weg van de therapeut) – 2 opties op deze tier: body parts/whole body

Voor de categorie gewichtsinzet/WEIGHT engagement:

4. **weight engagement individual** – annoteer deze tier als de deelnemer met intentie gewicht inzet tijdens individuele bewegingen – 2 opties op de tier: active/passive

5. **weight engagement with partner** – annoteer deze tier als de deelnemer met intentie gewicht/kracht inzet tijdens het bewegen met de therapeut – 2 opties op de tier: actieve/passive
   Let op: Deze acties kunnen eventueel ook via materiaal verlopen (b.v. tijdens stokgevechten of acties met de fysiobal)

6. **weight regulation with partner** – annoteer deze tier als de deelnemer met intentie zijn kracht/gewicht afstemt op de acties van de partner (niet doorschiet of juist te weinig gewicht/kracht meegeeft aan de actie) – 2 opties op de tier: light/stong

Voor de categorie tijdregualtie/TIME regulation:

7. **synchronisation in rhythm** – annoteer deze tier als de deelnemer zijn timing/ritme afstemd op dat van de partner – geen optie op de tier (na selectie klick alleen "enter")

8. **synchronisation in phrasing** – annoteer deze tier als de deelnemer de timing van de bewegingsfrase afstemd op die van de partner – geen optie op de tier (na selectie klick alleen "enter")
   NB: de sync in phrasing kun je hier het beste opvatten al seen bewegingslus van "homebase" naar "homebase" (zoals bedoeld in het MPI)

DE DATA STICK:

De stick is beveiligd met een wachtwoord.
Op de stick zijn alle files die je tijdens de trainingen hebt aangemaakt geplaatst in de map "voorbereiding"
De template file die op je USB stick staat moet heten: "template_SOM_MOVA_IV.etf"
Bij sommigen staat ook de snelkoppeling naar ELAN op de stick – als je die aanklckt opent het programma.
Er zijn twee mappen met test-sets, "testset_1_gesorteerd" en "testset_2_gesorteerd"
Testset_1 heb ik toegevoegd om er even in te komen –die fragmenten bekijk je alleen voor de introducite, die hoef je niet te annoteren met ELAN.
Voor je start met de annotaties:
Controller svp of je alle genoemde files op je data-stick aantreft – mocht er iets missen of twijfel je neem even contact op svp.
Maak zelf een map aan op de data-stick waarin je je annotaties op gaat slaan: geef een naam waarin ook je initialen zijn verwerkt, b.v. "annotatie_RS_MOVA_IV" of: "output_RS_MOVA_IV"

DE BEWEGINSANALYSES:

TER INTORDUCTIE:
Bekijk de filmpjes uit testset 1 – je hoeft ze niet in ELAN te laden – maar dat mag natuurlijk wel. Als je ze in ELAN wilt bekijken gebruik je geen template.
Als je een filmpje hebt bekeken, voer dan in de onderstaande lijst in wat je indruk is:
- is er naar jouw indruk sprake van contact-name door het kind?
- zo ja, verloopt dit naar jouw indruk vooral via "space", "weight" of "timing" (of een combinatie van 2 of alle 3)?

Preparatory files		**Your initials:**		
	INTERSUBJECTIVE ENGAGEMENT	**SPACE**	**WEIGHT**	**TIMING**
file:	(please indicate: J/N)	(please indicate: X)	(please indicate: X)	(please indicate: X)
Ag				
Bf				
Cd				

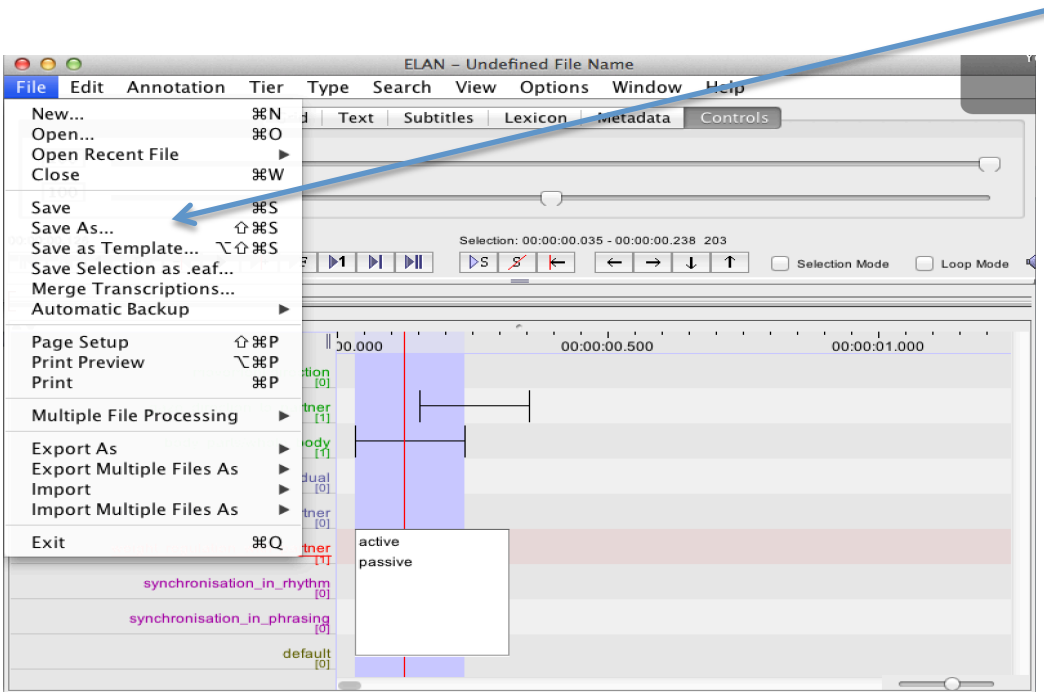
Da				
Eh				
Fb				
Gc				
He				

ELAN ANNOTATIES:
Na de introductie start je met de ELAN annotaties.
In testset 2 staan de fragmenten die je gaat annoteren met ELAN. In je map staan alleen de files die na random choice voor jouw geselecteerd zijn – ik weet niet wie van jullie welke fragmenten bekijkt. Als je vragen hebt over een specifieke file, geef svp altijd de file-naam mee aan.

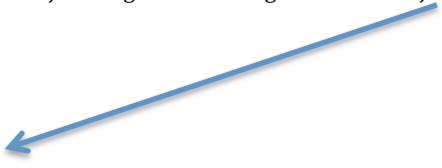
Hier nog eens in het kort de procedure voor de annotaties"

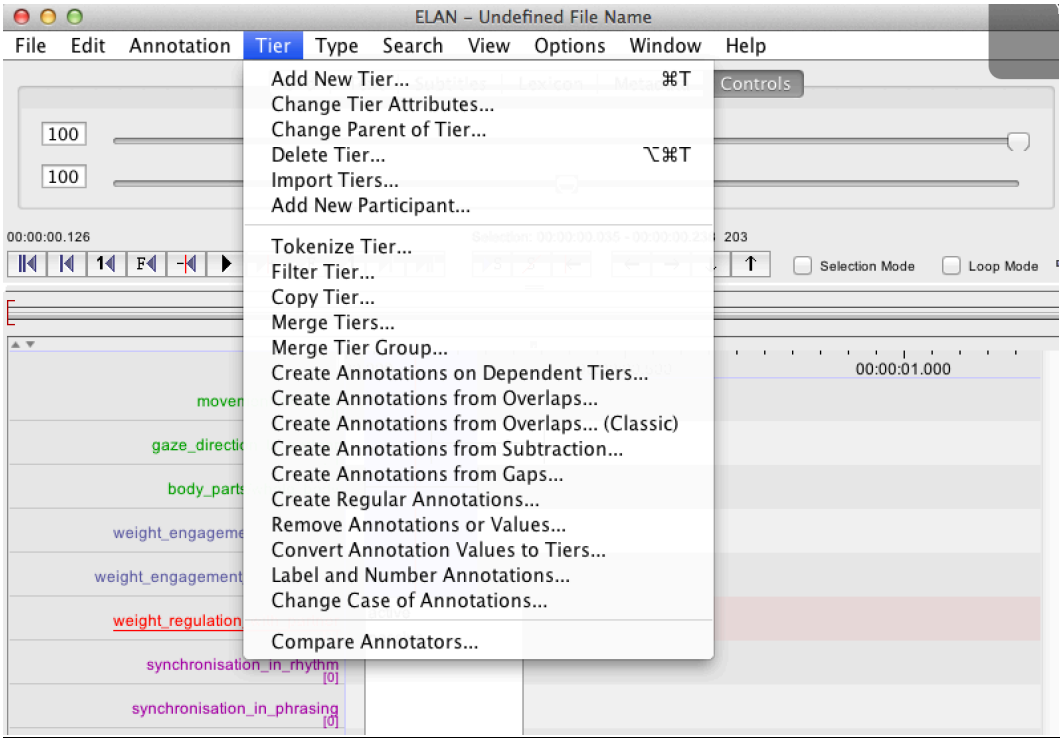
- Open ELAN.
- In het menu klick "file" dank lick "new".
- Kies de video-file die je wilt bekijken
- Voeg de template file toe
- Annoteer de file
- Sla je annotaties op – gebruik hiervoor altijd de combi van de file-naam met jouw initialen: b.v. Ag_NR, Ag_IW, Ag_BW,

LET OP:
Sla de annotaties uitsluitend op de daarvoor beveiligde stick op – de data-gegevens mogen beslist niet op je computer worden opgeslagen!
Mocht je je een keer vergissen, verplaats dan de betreffende file alsnog naar de data stick. Eventueel achtergebleven files op je computer verwijder je naar de trash – en vervolgens maak je de trash veilig leeg ("secure empty trash) – alleen dan kun je er zeker van zijn dat het materiaal volledig verwijderd is.

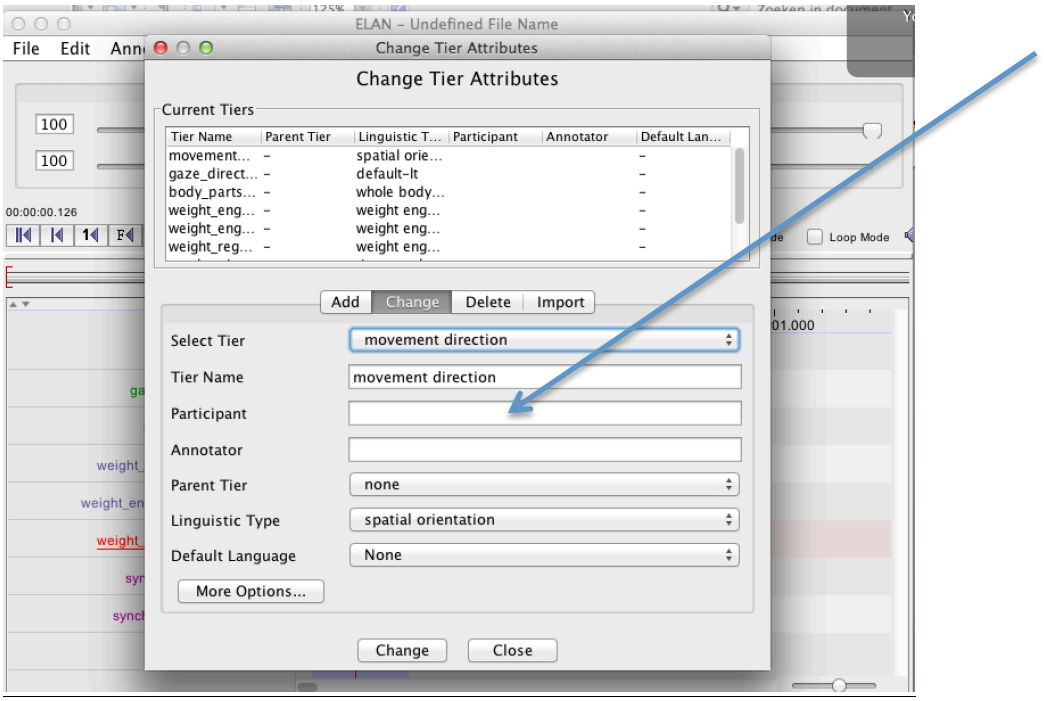


Tijdens de interraterdag hebben wij ook de volgende optie doorgenomen:
Je kunt ook in de annotatie sheet de naam van de file en jouw eigen naam aangeven. Dat doe je zo:

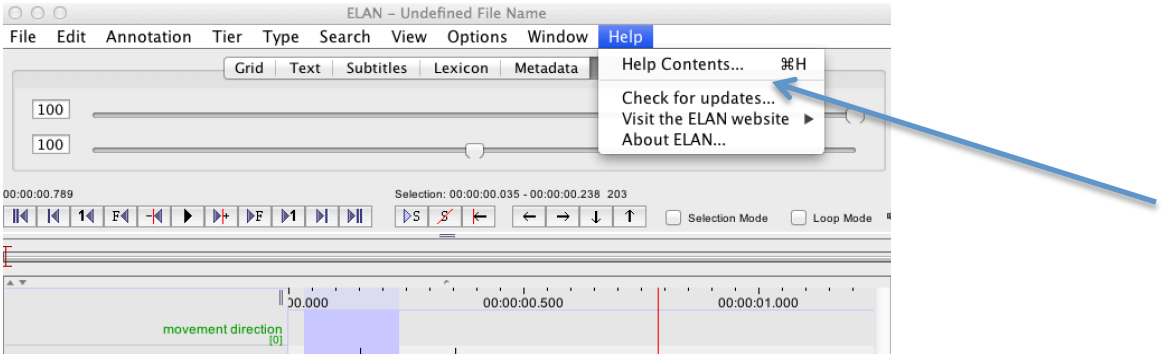


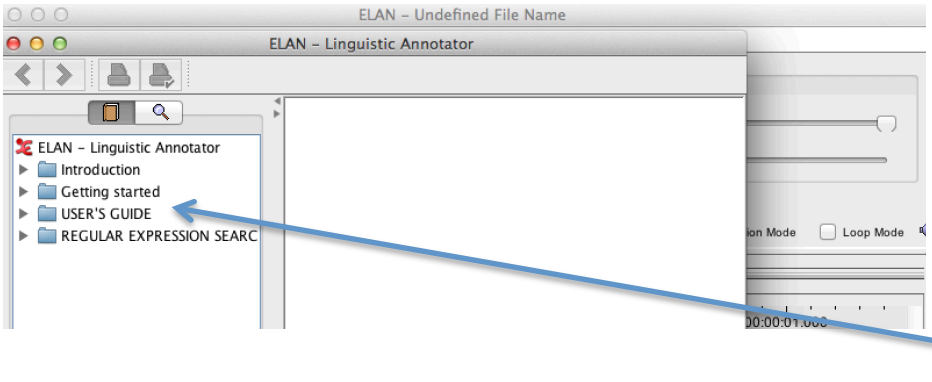


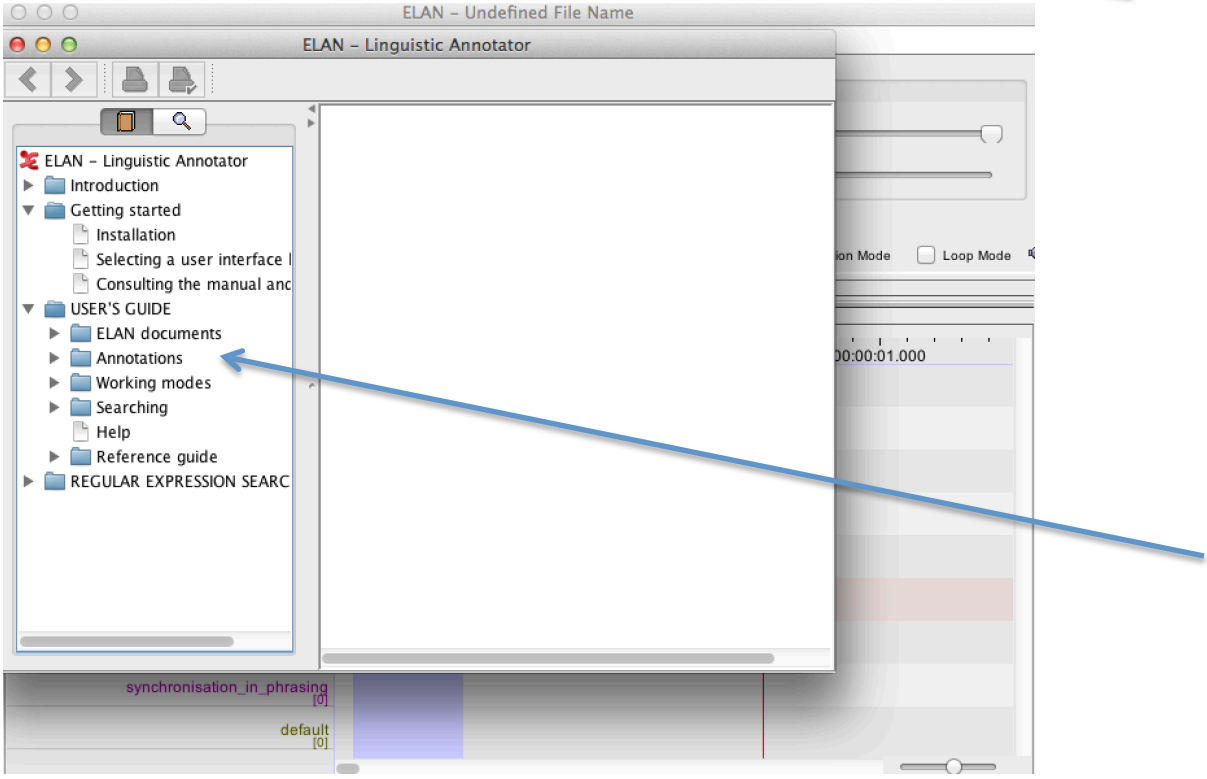
klick in het menu op "tier" – kies: "change tier attributes"
op de regel "participant" kun je de naam van het video-fragment invullen
op de regel "annotator" kun je jouw initialen invullen.
In principe kun je dit voor elke tier doen – maar als je dit wilt doen is het voldoende om het alleen voor de eerste tier te doen (movement direction) – die opent ook als eerste als je dit venster opent.



HULP NODIG?
Als je tijdens het annoteren even niet meer weet hoe bepaalde zaken in het programma werken, dan is het handig om de ELAN manual erbij te pakken. Je hoeft daarvoor niet uit je annotaties te gaan, maar je kunt die vinden onder het tabblad "help"







<u>Tenslotte:</u>
Tijdens de interraterdag hebben wij afgesproken dat je bij twijfel over een annotatie ook elkaar mag raadplegen. Doe dit vooral, maar maak er svp ook even een notie van. Geef daarbij svp aan om welke file het gaat – welke annotatie het betreft (b.v. movement direction) en bij welke tijd (b.v.: 35 sec – 37 sec). Dan is het voor mij duidelijk. Ook als je ergens erg twijfelt kun je dit op deze manier bij houden. Voor dergelijke notaties stuur ik jullie een "annotator's comments sheet).

Ik heb geprobeerd om jullie opmerkingen tijdens de interraterdag deze handleiding te verwerken – mocht je nog zaken missen of onduidelijk vinden, neem dan svp even contact op.
Jullie bijdrages hebben voor mij al veel zaken verhelderd. Het is een flinke klus, maar ik hoop dat het voor jullie ook interessant en leuk werk gaat zijn.

VEEL SUCCES!


(still uit: "the second person" NDT)

Rosemarie Samaritter
Maastricht, April 2014

Appendix 13: Design fMRI pilot

The originally envisaged fMRI data-collection

Introduction

The original set-up of this project was designed to test the effects of the Shared Movement Approach on interpersonal relating behaviours of participants with ASD from outcomes of movement analysis, parental questionnaires and functional magnetic resonance imaging. The research activities during the first two years of the PhD trajectory were mainly directed towards the development of the fMRI part of the project.

The researcher had followed a 'Certified User Training' at the fMRI lab at the University of Maastricht in July 2011. For the specification of neuropsychological input for fMRI tasks, programming technical scanner input and the procedures for conducting fMRI scanning sessions the researcher had followed a fMRI course at the University Groningen (BCN Introductory course September 2011). Software programmes for fMRI data analysis, like Matlab and SPM 8 had been studied mainly through tutorials available via the Internet.

The fMRI part of the original project was piloted in January 2012 at the Social Brain Lab at University of Amsterdam under supervision of the then third supervisor Dr. Christian Keysers, head of the KNAW social brain lab. [8]

Relevant theoretical background for the brain imaging study

Recent findings in neuroscience shed new light on interpersonal engagement in ASD.

In the 1990s researchers at the University of Parma discovered mirror neurons (MNS) in Macaques monkeys. These neurons fired when the monkey observed a goal directed action as well as when he executed the action himself (Rizzolatti, Fadiga, Gallese & Fogassi, 1996). FMRI experiments in humans suggest that the human pre-motor cortex, posterior parietal

[8] Please note that the following text has been written in 2012 of the initial project.

lobe and somato-sensory cortices have similar properties (e.g. Gazzola & Keysers, 2009). In the prefrontal gyrus in human beings a similar neuronal response was found. Recently researchers succeeded to show mirror neuron activity with single cell recordings in the human brain (Mukamel et al, 2010). The discovery of neurons that are activated by actions performed by the self as well as performed by the other generated new insight on how humans can relate their own actions to those of others.

Mirror neuron activity has been proposed to play a central role in social relating (my own reaction could tell me about the other) and imitation (i.e. I might develop skills by taking other subjects' actions into my own body) (Rizzolatti, Fogassi & Gallese, 2001; Gallese, 2003; Gallese, Rochat, Cossu & Sinigaglia, 2009).

As experiencing is bound to the embodied self (Rochat, 2002), the social templates of brain/neuronal structure are the result of embodied relational experiences (Jonsen, Churchland, Damasio, Moreno, Schaffner & Mobley, 2002). We might therefore expect that the neuronal wiring of the brain will develop new pathways for action recognition and social relatedness by embodied experiences that combine perceptive and proprioceptive sensory input. Coming from an impaired non-verbal attunement in the child-parent dyad and triad a lack of experience in perceptive and proprioceptive movement traces will grow. This may lead to a lack of experiential traces to form neurological connectivity. Thus a limited plasticity in brain-structures will determine perceptual sensitivity according to the earlier experiences.

Compensational intervention during adolescence might support relational engagement and provide intersubjective experience (see for the same concept "Nachsozialisation" (Petzold, Goffin & Oudhof, 1993). Keysers suggested that the neuronal networks are shaped by simultaneous co-operating groups of neurons. Through "Hebbian learning" (Keysers & Perrett 2004) cells that fire simultaneously would then build shared neuronal circuits.

In brain imaging research with fMRI, participants with ASD have shown reduced or atypical activation in mirror neuron circuits during facial action observation and imitation (Dapretto et.al. 2006) and recent theories emphasise the involvement of shared neural circuits (for action and action observation) in the impairment of social-emotional functioning (Keysers & Gazzola, 2006). Interestingly, activity in the MNS increases with age in ASD participants, is predictive of social functioning and is normal by age 30 years (Bastiaansen et al., 2010). These age-related changes show that the working of the MNS is not broken in ASD, but rather delayed. This provides leverage for therapeutic interventions that might be able to accelerate the normal recovery of the system by providing optimal sensorimotor contingencies.

Taking into account the findings from neuroscience discussed above, it is expected that when non-verbal attunement is improved in the DMP setting there will also be a change in neuronal regulation of these processes. Earlier research has shown that the activation of the mirror neuron system is influenced by learning processes (Calvo-Merino, Glaser, Grèzes, Passingham & Haggard, 2005; Keysers & Perrett, 2004). DMP intervention will support embodied learning; neuronal connectivity will be supported by movement experiences that at the same time engage exteroceptive (visual and auditory) perceptions as well as proprioceptive experiences (alignment, weight, motor intention). We expect that changes in the movement profile will have correlates in activation of neuronal circuits that participate in mirroring activities. The idea is that the simultaneity of activity in regions encoding the sound and vision of the therapist's actions (high level visual and auditory cortices) and of the patient's movements (premotor, posterior parietal and somatosensory cortices) would encourage Hebbian learning and strengthened connections between neurons encoding corresponding actions during execution and perception (Keysers & Perrett, 2004).

Study Design

This is the first phase of study in this area, therefore a in-depth single case design was chosen for this study. The design will combine pre and post intervention brain imaging data, movement pattern data as well as data through questionnaires. Data of an intervention group (n=7) will be compared to that of a control group (n=7). There will be testing trials (n=3) initially to clarify tools, procedures and refine methodology.

Pre-post intervention data collection in quasi-experimental design (intervention-group versus control):

a. movement pattern data of non-verbal communicative behaviour obtained by qualified raters
b. standardised questionnaires on the social behaviour of children with ASD, completed by caregiver
c. functional brain-imaging scans during action observation.

The analysis of pre/post intervention data will, for the intervention group, be contrasted to outcomes of analysis of data of repeated measurements collected throughout the intervention. The intervention will consist of 24 DMP sessions, conducted in a reversal design in which blocks of attuned movement will be alternated by non-specific movement intervention. Three independent qualified raters, blinded to each other, will assess event-related movement pattern analysis taken from randomly distributed video vignettes.

Experimental design:

Convergent measurement with data collected through movement pattern analysis, parental questionnaires on social behaviour and fMRI scans in randomised controlled group of adolescents with ASD before and after 24 sessions DMP will be compared and contrasted by

repeated measurements on social orienting movement behaviour collected throughout the intervention

The fMRI experiment will be set up in a block design. Subtractive analysis will investigate block related differences in the neuronal activation between two experimental conditions. During task blocks participants will watch short movie clips of movement sequences. During control blocks participants will view still photographs of the same body parts. The participants will also be instructed to move their hands, feet and eyes to localise regions involved in the execution/proprioception of the hand and foot actions involved in dance.

The movement profile of participants will be analysed from video-vignettes taken during the free play movement session before and after the DMP treatment.

Event related movement analyses from randomised vignettes will assess data on non-verbal attunement behaviour of the child (e.g. eye-contact, initiating movement play, directing movements towards partner) during the different intervention phases.

For the intervention group additionally video-vignettes taken during sessions 1, 6, 12, 18, 24 of the intervention will be analysed to collect repeated data on social orienting behaviour of the children during the intervention.

The profile of social engagement of the child before and after DMP will be taken from the outcomes of standardised parental questionnaires.

Functional Magnetic Resonance Imaging

Before and after the 24 sessions of DMP the participants will undergo a fMRI scan. During this scan the participants will lie in a scanning tunnel. Their head will be stabilised. To

protect the participants from the noise of the scanning machine they will wear headphones. Through these headphones they can also have contact with the investigator. During the scanning procedure they will watch clips from movies showing movement actions or execute actions. The set up of the film clips follows a blocked design: blocks of observing dance movement movies and phases of observing the same actors standing still. During the later, action execution phase, participants will be asked to execute hand actions, foot actions or eye movements. The aim is to define motor regions involved in hand and foot action execution (more than during the control condition of eye movements) in order to interpret overlapping visual activations as putatively mirror (Gazzola and Keysers, 2009). For this procedure scanning facilities of Maastricht University will be hired. Before going to the actual scanning situation, the participants will have the possibility to experience the scanning procedure in a mock scanner. The scanning lab of Maastricht University has a Siemens Magnetom Allegra 3 T head only MRI scanner.

The scanning procedures and fMRI related measurement and data analysis will be supervised by Prof. Dr. C. Keysers, Department Head of the Social Brain Lab at the Netherlands Institute for Neuroscience (Amsterdam). In addition, an anatomical scan and a resting state scan will be acquired.

The fMRI pilot

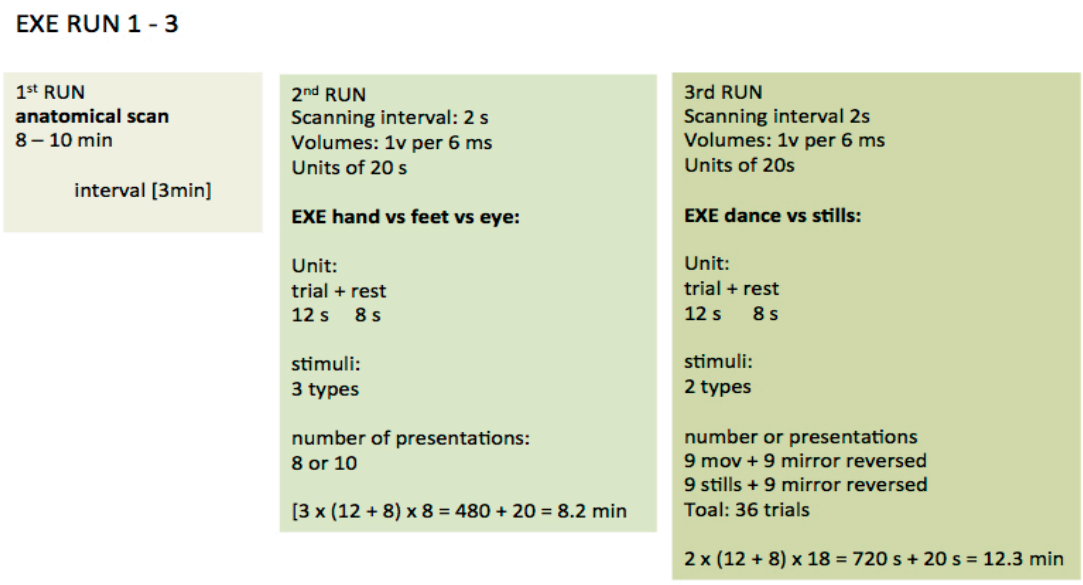
- MOVING TOWARDS BRAIN IMAGES -

The tasks for the scanner input were designed to appeal to the movement experiences the participants had throughout DMP. As it is not possible to perform full body movement in the scanner it was decided to use hand and feet movements to determine which brain areas are active during movement - these outcomes were meant to be subtracted with outcomes of brain areas involved in eye movements in order to define which brain regions are involved during active movement (without the noise of brain regions involved in eye-movements).

Thus defined regions of interest (ROIs) (Etzel, Gazzola, Keysers, 2009) were meant to serve as a chart to identify participants' brain activation while watching two dancers move together versus brain activation while watching two dancers standing in a still position.

Following the data of Calvo-Merino et al. (2005) who found the observation of familiar movement repertoire led to stronger neuronal activation in the mirror neuron system (MNS), we expected that the sensori-motor experience of non-verbal attunement during DMP would change the coupling between visual and motor regions in the patients' brains (Calvo-Merino et al., 2006).

Figure 1: overview scanning procedures for the fMRI pilot

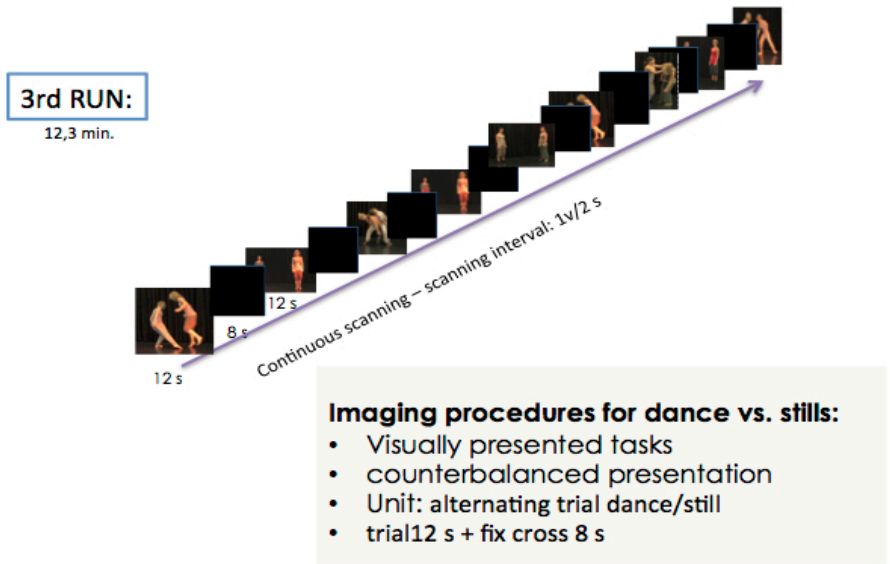


For the tasks during observation of moving duets or still duets video-vignettes had been prepared that were presented during the 3rd run of the scanning procedure. The material was developed during two workshops with dance therapy students from the Zuyd University in Heerlen (NL). During these workshops students developed movement material of dyadic shared movement situations. The interpersonal relating was the focus for the dancers, more specific the students' sense of being connected or disconnected to their dance partner.

In one minute improvised duets students used diverse movement elements to connect or disconnect with their partners. From the video-taped improvisations 9 vignettes were selected by the researcher in view of diversity of social orienting movement elements. Then 12 seconds with the moment of attunement most convincing to the observer (researcher) were selected. The selected vignettes were grouped for the attuning movement used by the movers - in categories for SPACE – TIME- WEIGHT – according to the students and observers estimation.

The video samples were then edited with the software programme "Presentation" to fit into the scanning procedure. During the fMRI scanning these vignettes were presented in their original version and also in mirror reversed in order to avoid bias due to lateralisation. In this way a total of 18 vignettes were generated. The vignettes were then presented to the movement raters who would also do the rating for the main project. Although we did not measure this systematically the correspondence between movers' categories and raters' categories seemed to be quite high. The interrater agreement measured in Cohen's Kappa gave a good interrater agreement (absolute agreement po 0.85 and C's kappa: 0.77).

Figure 2: Scanning procedure dance vs. stills



Appendix 14: Dissemination of work

The following works have built upon ideas originally formulated in the course of writing the present thesis:

Papers:

Samaritter, R. & Payne, H. (2013). Kinaesthetic intersubjectivity: A dance informed contribution to self-other relatedness and shared experience in non-verbal psychotherapy with an example from autism. *Arts in Psychotherapy, 40*(1).

Samaritter, R. & T. Maagdenberg (*2012). Bewogen Levens. Nonverbale interventies in psychotherapie. Tijdschrift cliëntgerichte psychotherapie, 50*(4).

Samaritter, R. (2010). A nonverbal approach to intersubjectivity. In: *S. Bender (Ed.), Movement Analysis of Interaction.* (pp. 241-257). Berlin: Logos.

Presentations:

2015 Heidelberger Herbstakademie, The circularity of mind and body, GER.
Presentation: Kinaesthetic ways of knowing - embodied reflexivity in psychotherapy.

2015 Hogeschool Zuyd, Heerlen, NL. Opl Creatieve Therapie Dans en Beweging. Presentation & workshop: Movement Analysis in DMP research.

2015 Stenden Hogeschool, Symposium Creative Arts Therapy 'New Horizons', NL.
Workshop & presentation: Shared Movement Approach, een ontwikkelingsgerichte danstherapeutische interventie.

2014 Codarts, Hogeschool voor de Kunsten, Rotterdam, NL.
MA Dance therapy. Movement Analysis for DMP research. Presentation & workshop.

2014 1st European Conference Dance Therapy, Riga, LT.
Key presentation: Resilience as shared practice. Building resilience through DMT.

2014 University of Hertfordshire. Methodology seminar EdD, UK. Jan. 2014.
Presentation research methodology: Turning practice into research.

2013 ADTA conference, October 2013, New York, US.
Workshop and presentation : SHARED RHYTHMS – SHARED SPACES.
Creating connections to the embodied self through dance movement psychotherapy.

2013 ECARTE, Sept. 2013, Parijs, FR.
Kinaesthetic ways of knowing: embodied reflections on dance psychotherapy

2013 University of Hertfordshire, DMP research group, UK.
Presentation: Inside the Mirror. A pilot study on the effects of dance and movement intervention on interpersonal non-verbal attuenment in adolescents with ASD.

2012 ORBIS GGZ afd. jeugd, Sittard, NL.
Paper presentation & workshop: Non-verbale afstemming in de ontwikkeling van kinderen en jeugdigen. [Nonverbal attunement in the development of children and adolescents].

2011 National Congres FVB/Federatie vaktherapeutische beroepen, Nijmegen, NL.

Paper presentation: "Join the dance! Van klinische praktijk naar wetenschappelijk onderzoek". [From clinical practice towards academic research].

2011 Int. Conference: "Embodied and Narrative Practices: Clinical and Practical Applications", University of Hertfordshire, UK.
Samaritter & Payne: paper presentation: "Shared movement dialogue: How we learn about other's minds through embodied pre-narrative practice".

2011 Int. Conference: From motivation to movement: Towards an empirical understanding of the role of dance in health. Bedford University, UK.
Samaritter & Payne: paper presentation: Shared movement - A dance-informed contribution to psychotherapeutic interventions in disorders with a disturbed sense of self.

2011 Poster presentation "Embodied intersubjectivity: a contribution to a body-informed conceptualisation of intersubjectivity". Int. Conference: From motivation to movement: Towards an empirical understanding of the role of dance in health. Bedford University, UK.

2010 Poster presentation "Embodied Intersubjectivity", Int. Conference: Embodiment, Intersubjectivity and Psychopathology, Univ. Heidelberg, GER.

2010 European Conference for Movement Analysis in Education, Therapy and Science, München, GER.
Workshop & presentation "Shared rhythms – shared spaces".

2010 International conference "Space for Arts Therapies" Prague, CS.
Presentation: How to join the dance? Dance movement therapy research – from clinical findings towards research design.

2009 School of Psychology, University of Hertfordshire, UK.
Presentation in Research Series: Shared movement – a new approach to interpersonal attunement in children with autism spectrum disorder".

2009 Conference for psychosomatic medicine, Mainz, GER.
Presentation: Interpersonal attunement in autistic children.

2009 Regionaal overleg autism, ORBIS, Sittard, NL.
Presentatie: Inside the mirror – interpersoonlijke afstemming in autism. [Inside the mirror – interpersonal attunement in autism].