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# Psychometric properties of the Emotional Development Scale

*investigating reliability and validity including corrections with the Marschak interaction method and the neuroaffective mentalizing interview*

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# PSYCHOMETRIC PROPERTIES OF THE EMOTIONAL DEVELOPMENT SCALE

INVESTIGATING RELIABILITY AND VALIDITY INCLUDING CORRELATIONS WITH THE MARSCHAK INTERACTION METHOD AND THE NEUROAFFECTIVE MENTALIZING INTERVIEW

**BY**
**SUSAN HART**

DISSERTATION SUBMITTED 2018

AALBORG UNIVERSITY
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# PSYCHOMETRIC PROPERTIES OF THE EMOTIONAL DEVELOPMENT SCALE

## INVESTIGATING RELIABILITY AND VALIDITY INCLUDING CORRELATIONS WITH THE MARSCHAK INTERACTION METHOD AND THE NEUROAFFECTIVE MENTALIZING INTERVIEW

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Dissertation submitted

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# CV

**Susan Hart, PhD student** is a psychologist, specialist and supervisor in psychotherapy and child psychology. With a background in child psychiatry, family and adult therapy, Susan is now self-employed. She is the originator of neuroaffective development psychology, an understanding based on modern brain research that she began to develop about three decades ago by linking neuroscience with trauma research, attachment theory and developmental psychology. Her overriding present goal is to develop assessment methods aimed at making it possible to adjust the intervention by mapping the client's, parent's or child's, zone of proximal emotional development. She is currently developing ways to translate the neuroaffective concept into practice through her extensive lecture and workshop activity, publications, manuals and the present doctoral dissertation, which is based on research into recently developed assessment methods within the neuroaffective framework. She is the author, co-author and editor of 14 books on trauma, dissociation and neuroaffective developmental psychology and psychotherapy. Four of her books have been translated and published in English. Together with colleagues she has also developed two developmental programmes, one for children's groups and one for parent's groups.

# ABSTRACT

The practice of assessing children's emotional development based on a theoretical foundation of attachment theory, developmental psychology and trauma and brain research is fast developing within the field of clinical psychology. Within this theoretical framework, the Emotional Development Scale (EDS), has been developed as a measurement tool designed to assess the current emotional functioning level of 4–12-year-olds. The EDS consists of two scales: EDS-Performance (EDS-P) and EDS-Assessment (EDS-A).

The main focus of the dissertation is to investigate the reliability and validity of the EDS-P and the EDS-A as a basis for elaborating structured and specific intervention plans and measuring the effect of an intervention. The research study is based on a fixed design using quantitative data and statistical analysis aimed at investigating the psychometric properties of the EDS. The research design incorporates post-positivist scientific methods, and the underlying attitude behind the study is informed by pragmatism.

The empirical study is based on a correlational study of the EDS-P, focusing on interrater reliability, test-retest, internal consistency, concurrent, predictive and construct validity and of the EDS-A, focusing on internal validity and on the internal validity of the EDS-P and EDS-A together. The study of concurrent validity focuses on an analysis between non-referred and referred groups based on the data from the empirical study and a preliminary ad hoc sample from Hogrefe Ltd. (n=213). The predictive validity investigates the progression between the levels of mental organization. The construct validity correlates the EDS with two other newly developed assessment tools measuring the intersubjectivity between child and caregiver and the caregiver's mentalizing capacity, and with two evidence-based standardized questionnaires. The validity study concerns both the EDS-P and EDS-A.

Subjects in the study are 36 children aged 4–12-years, each along with one parent, who have been referred to a day-family-treatment centre. Included in the study are eight day-family-treatment centres from various parts of Denmark, each of which has a minimum of two psychologists assigned to handle the uptake. Eighteen psychologists in total participate in the experimental design.

The empirical study together with the preliminary ad hoc sample from Hogrefe Ltd. found that the EDS-P is a consistent, reliable and valid measure of 4–12-year-olds' emotional development. The internal consistency between the two scales, the EDS-P and the EDS-A, showed that the scales cannot be merged into one scale, and the validity study showed that it is uncertain what the EDS-A measures. The concurrent validity of both the two scales, the EDS-P and EDS-A, demonstrated the measurement tool's ability to distinguish between age groups and referred/non-referred groups, and

the predictive validity of the progression showed promising results on the EDS-P. In the study of construct validity, the results indicated a connection between the child's emotional development, the parent's mentalizing capacity and the parent-child interaction, although the results were not as straightforward as expected.

# ENGLISH SUMMARY

## Background

Due to emotional difficulties, a growing number of children are referred to regional educational-psychological advisory services and child psychiatric services with mental problems related to emotional vulnerabilities. For instance, from 2011 to 2012, a U.S. National Survey of Children's Health revealed that 16.5% of 3–17-year-olds had a current diagnosis. In Europe, the same tendency has been demonstrated. For instance, in Denmark from 2006 to 2016 there was a 91% increase in referrals to child and adolescent psychiatric services.

The practice of assessing children's emotional development based on a theoretical foundation of attachment theory, developmental psychology, trauma theory and brain research is fast developing within the field of clinical psychology and family social work. One of these integrations is neuroaffective developmental psychology (NADP), which has been developed with the aim of understanding and navigating in the complex world of emotional development and parent-child intersubjectivity. The effort has been to create relevant intervention plans to meet the needs of children's emotional, personal and social development. The NADP framework is a way of understanding children's normal emotional development and of examining how this development may be promoted or disturbed by relational issues (Hart, 2011). Within this theoretical framework, the researcher (since 2012 in cooperation with colleagues) has developed a measurement tool, the Emotional Development Scale (EDS), to assess the current emotional functioning level of 4–12-year-olds.

## Purpose

The main focus of the empirical study is to investigate the reliability and validity of the EDS by measuring functions, that is, competencies and vulnerabilities, on three distinct levels of mental organization: the autonomic, the limbic and the prefrontal, as a basis for developing structured and specific intervention plans and measuring the effect of these interventions. To examine the validity of the EDS, it is correlated with a tool that measures the intersubjectivity between child and caregiver and a tool for measuring the caregiver's mentalizing capacity and two evidence-based standardized questionnaires.

## Literature Review

Before the empirical study was initiated, a literature review was conducted to test the assumption that it is difficult to find measurement tools that focus on emotional development. The literature review revealed that it is relevant to develop a

measurement tool that offers helpful information on emotional-age-specific development, emotional competencies and emotional vulnerabilities. The literature review focused on measurement tools aimed at 4–12-year-old children's emotional development, competencies and vulnerabilities. A block search, a reference search (snowball), a free-word search and a keyword search were conducted using the search engines Primo and Google Scholar. In addition, a search was conducted of established psychological test publishers' catalogues as well as a hand search of psychological assessment methods and tests used in clinical settings. A thesaurus search was undertaken to help find synonyms to define new keywords in addition to keywords drawn from the theoretical and empirical literature as well as the keyword combinations found using Boolean connectors.

The literature review found a predominance of measurement tools consisting of self/other-reporting via questionnaires completed by children, parents and/or teachers whose answers are transformed into rating scales; this accounts for 18 (60%) of the 30 assessment methods found. Eight performance tests were found that address aspects of emotional capacity, but they did not consider the aspects in a structure designed to assess emotional development. Concerning performance tests, no tests were found that included a theoretical approach of mental organizations of emotional development or scales that measure the level of emotional development. Also, no measurement method was found that divides emotional dimensions into mental organizations and looks at emotional development, apart from the NMT (Perry & Hambrick, 2008; Mackinnon, 2012; Perry, 2008; Barfield et al., 2014).

**Measurement Tools**

The EDS consists of the EDS-Performance (EDS-P), which is a performance test, and the EDS-Assessment (EDS-A), which is a structured assessment consisting of two parts that informs the psychologist about the child's level of emotional functioning concerning aspects that are not measured by the EDS-P. The EDS-A is designed as a structured interview for parents, caregivers or professionals who know the child well. The EDS-P and the EDS-A are designed to support each other. The EDS-P is administered in a structured setting, where the psychologist challenges the child through activities and asks questions. The psychologist assesses the child's ability to handle the activities and assesses the quality of the answers with regard to the child's mentalizing capacity. The EDS-A involves asking as many informants as possible who know the child well about the child's emotional competencies and vulnerabilities outside the clinical setting. The psychologists score the answers.

The EDS was correlated with the newly developed measurement tool, the Neuroaffective Mentalizing Interview (NMI) (recently renamed the Emotional Mentalizing Scale (EMS)), which is a structured interview for assessing adults' mentalizing capacity. The NMI is based on a brief interview aimed at addressing implicit mentalizing, connecting mental language with body language and

synchronization capacity (Birck, Corlin, Hart & Hellborn, 2018). The EDS was also correlated with the Marschak Interaction Method (MIM), which is a structured play-based dyadic observation assessment method aimed at gaining insight into the quality and nature of the caregiver-child relationship, that is, the intersubjectivity between caregiver and child. In the empirical study, the qualitative assessment was converted into a quantitative study, and psychometric qualities with a rating scale were developed for the four dimensions and renamed Marschak Interaction Method of Psychometrics (MIM-P). The EDS was finally correlated with the Parent Stress Index (PSI) and the Parent-Child Relationship Inventory (PCRI), which are evidence-based, standardized, clinical and research-based self-report questionnaires described as a screening and diagnostic assessment method designed to yield a measure of stress in the parent-child system and examine how caregivers view the task of parenting, and how they feel about the child.

## Research Questions

The dissertation examined the following research questions:

I:
What are the psychometric properties of the EDS, including reliability and validity of the autonomic, limbic, prefrontal and total scores on the EDS-P and EDS-A scales?

II:
Is the correlation between autonomic, limbic and prefrontal scores on both the EDS-P and the EDS-A predictive of emotional developmental progression as described in NADP?

III:
What is the correlation between the tested children's emotional development, as measured with the EDS; parent-child intersubjectivity, as measured with the Marschak Interaction Method of Psychometrics (MIM-P); and parental mentalizing capacity, as measured with the Neuroaffective Mentalizing Interview (NMI)?

## Design and Method

The research design is based on a fixed correlational design with quantitative data and statistical analysis and is part of an effort to develop and bring more structured measurement tools based on NADP into the clinical work in order to obtain relevant structured information to guide interventions (Poulsen & Simonsen, 2017). The research design incorporates post-positivist scientific methods in order to produce reliable and valid finding, and the epistemological rationale behind the study rests on pragmatism, that is, a concern for practical matters that is guided by practical experiences rather than solely by theory (Coolican 2009; Phillips & Burbules, 2000;

Robson & McCartan 2016).

The study focuses on interrater reliability, test-retest, internal consistency, concurrent, predictive and construct validity of the EDS-P and EDS-A. As the EDS is developed in collaboration with Hogrefe Ltd., the preliminary ad hoc sample (n=213) from Hogrefe Ltd. is correlated with the empirical data regarding concurrent and predictive validity. The preliminary ad hoc sample from Hogrefe Ltd. is not a part of the empirical study, and only data that were found to be relevant to elucidate certain aspects of the empirical study were included. The study of concurrent validity consists of an analysis between non-referred and referred used to investigate the difference between the two groups together with age and gender differences. The study of predictive validity was used to investigate the progression between the autonomic, limbic and prefrontal levels. It was conducted by merging the sample of the empirical study and the preliminary ad hoc sample from Hogrefe Ltd. The analysis was conducted by calculating the mean based on a percentage of max scores. The scores were analysed across age and age groups – 4–8-year-olds and 9–12-year-olds – and across gender. Since no measurement tools were found that matched the exclusive focus on emotional development, the construct validity was analysed by correlating the EDS with the MIM-P, the NMI, the PSI and the PCRI.

**Data Collection and Analysis**

Subjects in the study were 36 children, aged 4–12 years, along with one of their parents, who had been referred to a day-family-treatment centre due to family-related difficulties prior to the selection. The mean age of the children was 8.58 years (*SD* = 2.16), boys; 54.3%, girls; 45.7%. The researcher strove to comply with all ethical rules and considerations. As the families were considered to be in a vulnerable situation when they were referred to the family-care centre, they were treated with a high degree of respect and given as much information as possible without overwhelming them with excessive or overly complex information. If the parents who were referred for family treatment declined to take part in the research study, this was respectfully accepted.

The children and parents were recruited at the beginning of their stay at the treatment centre. The referred child conducted the EDS-P together with the psychologist; the child's mother or father participated with the child in the MIM-P, was interviewed for the NMI and EDS-A and completed the standardized questionnaires (PSI & PCRI).

Included in the study were eight day-family-treatment centres located in various parts of Denmark, each of which had a minimum of two psychologists to handle the uptake and scorings. Eighteen psychologists participated in the experimental design. The same two psychologists at each treatment centre who were in charge of recruiting the families were also in charge of conducting and scoring the and assessments/tests. To ensure interrater reliability, the EDS-P, the NMI and the MIM-P were video-recorded

to allow for blinded ratings. To ensure test-retest reliability within one to seven weeks, a retest of the performance part of the EDS-P was conducted before the intervention was implemented. For the validity study, all tests were conducted before the intervention period began.

All the participants in the empirical study were referred, while 86.6% in the preliminary ad hoc sample (n=213) from Hogrefe Ltd. were non-referred, which made it possible to correlate the EDS with a referred and a non-referred group.

**Results**

There was a significant, positive correlation between the scoring of psychologist 1 and 2 in EDS-P, which indicates strong agreement between raters. A significant positive correlation was found in the test-retest analysis of the EDS-P, which indicates a strong correlation between the first and the second testing of the child. The EDS-P appear to have good internal consistency: Cronbach's alpha = .838. The correlations between scores ranged from .727 to .973, $p < .001$. The EDS-A also appears to have good internal consistency: Cronbach's alpha = .874. The correlations between scores ranged from .809 to .952, $p < .001$. The four different scores in, respectively, the EDS-P and the EDS-A (autonomic, limbic, prefrontal and total) appear to have good internal consistency: Cronbach's alpha = .813. The correlations between scores ranged from .084 to .400.

In the comparison of similarities and differences between the referred and the non-referred groups, two control variables from demographic data – gender and age – were analysed. Independent samples t-test revealed no significant difference between the referred and non-referred groups regarding age and gender. In comparing referred and non-referred groups, independent samples t-test revealed a significant difference between the referred and non-referred with regard to all the levels as well as total scores on the EDS-P and the EDS-A. Independent samples t-tests revealed significant differences between referred and non-referred 4–8-year-olds in terms of scores on the autonomic, prefrontal and total score on the EDS-P. At the limbic level there was no significant difference ($p = \geq 0.05$). Independent samples t-test and Mann-Whitney U test revealed significant differences between referred and non-referred 9–12-year-olds in terms of scores on the autonomic, limbic, prefrontal and total scores. Independent samples t-test revealed a development in emotional competencies between 4–8-year-olds and 9–12- year-olds in both the non-referred and the referred group regarding EDS-P, although the development was larger for the non-referred group compared to the referred group.

Independent samples t-tests revealed significant differences between referred and non-referred girls in terms of scores on the autonomic and prefrontal and total score. On the limbic level there was no significant difference ($p \leq 0.05$). Independent

samples t-tests revealed significant differences between referred and non-referred boys in terms of scores on all levels.

The analyses of predictive validity suggest a progression or equality of levels between the autonomic, limbic and prefrontal mental organizations across age groups and genders. The same clarity was not found for the group of non-referred participants, which showed a low limbic level on the EDS-P and a high limbic level on the EDS-A. The analyses of the differences between the EDS-P and the EDS-A shows that in the group of referred the mean of scores on the EDS-A is lower than on the EDS-P, but in the group of non-referred group, the mean of scores on the EDS-A is higher than on the EDS-P.

Pearson's correlation coefficients showed an expected significant negative, but modest, correlation between the EDS-P and PSI as well as significant modest unexpected negative correlation of a few points between PCRI and EDS scores. No correlations and no significance were found between the EDS-P, EDS-A and NMI. Pearson's correlation coefficients showed significant and modest correlations between MIM-P and EDS scores for 4–8-year-olds and for 9–12-year-olds. Several significant and modest correlations were revealed between the MIM-P and EDS scores in the boy group. No correlations were found between the EDS-P/ EDS-A and MIM-P in the girl group. Pearson's correlation coefficients showed many significant and modest correlations between MIM-P and NMI scores.

## Discussion

The study revealed that the EDS was administered in a consistent and stable manner with standardized procedures and good psychometric properties. This study together with the standardization procedure implemented by Hogrefe Ltd. moves EDS one step closer to publication.

If EDS captures emotional development on the limbic level the results regarding EDS-P may pinpoint some interesting findings regarding Western European culture. For instance, the difference between referred and non-referred was much weaker on the limbic level compared to the autonomic and prefrontal levels. This may reveal that reasons for referral is not associated with competencies or vulnerabilities on the limbic level but has much more to do with vulnerabilities and self-regulation problems related to autonomic and prefrontal functions. Unexpectedly, perhaps related to the lack of sufficient training of the psychologists, the EDS-A was mostly treated an assessment of the parent's internal representations of the child. The lack of internal consistency between the EDS-P and the EDS-A may reveal that the parents respond to the child's behaviour, and that it may be difficult for them to rate their children correctly. Both the performance test and the structured assessment are aimed at assessing functions on the three emotional levels: autonomic, limbic and prefrontal. The mean differences between the EDS-P and the EDS-A showed that in the group of

referred children the parents' internal representations of the child's emotional competencies are highly negatively biased, and in the group of non-referred children they are moderate or highly positively biased. This may reveal that, if the parents have no cause for concern for their child, they perceive the child to be well regulated with high emotional competencies, and if they do have concerns regarding the child, or if they are perhaps themselves in emotional turmoil, perhaps related to the reasons for referral to family treatment, they perceive their child in a more negative light. It may also indicate that the non-referred child's parents, in contrast to the referred child's parents, is capable of modifying their internal representations according to the child's maturational process, or their internal representations are positively biased.

The result suggests that the large group of non-referred children shows highly developed prefrontal competencies, but not necessarily high limbic competencies. This could be due to demands in Western European society, which place a high priority on the ability to self-regulate, perform acts of will and exercise impulse inhibition, and which assigns a key role to the stimulation of prefrontal structures through education (Rybanska, McKay & Jong, 2017). According to Choudhury (2010) it takes well-developed prefrontal functions to thrive in a Western European society. This may result in an excessive focus on eliminating emotional problems through psychiatric diagnoses and medication (Brinkman, 2016; Jørgensen, 2012).

The absence of significant correlations between the EDS and the NMI suggests that there is no correlation between the referred parents' mentalizing capacity and the child's emotional development and competencies, as measured on the EDS-P. This was an unexpected finding, as much research has found a correlation between secure attachment and high mentalizing capacity (Katzenelson, 2015; Sleede, 2013), and it may reveal that as children grow older they are more influenced by their mutual interaction with the extended environment, that is, other family members besides their parents, including peers, teachers and others for their emotional development. The child's inherent capacities for self-regulation also play an important role in this regard.

Many significant and modest correlations were found between the parent's mentalizing capacity and the MIM-P on parental dimensions. This finding may suggest that the way the parent mentalizes the child has a great importance for the parent's capacity to create an atmosphere of shared intersubjectivity. It may reveal that the quality of the intersubjectivity between parent and child is more dependent on the parent's mentalizing capacity than on the child's emotional development and competencies. From an NADP perspective, the results indicated a connection between the child's emotional development, the parent's mentalizing capacity and the parent-child interaction.

**Limitations**

Several limitations of the present study are fully recognized. A larger sample size

would enable a more valid normal-range calculation. This fact together with the limitation of only conducting a quantitative study and the absence of a non-referred control group limits the generalizability of the results. Finally, it was not possible to train the psychologists properly in the different measures used in the study, which seems to have been particularly troublesome regarding the EDS-A.

Eighteen psychologists were involved in the interrater reliability study, but the study was carried out in pairs, as only two psychologists were involved in any given rating due to the limited resources of this research project and the prohibitive amount of time it would have required to have additional psychologists rate each sample.

It would have been beneficial to conduct an experimental design with a randomized control trial using a control group, for example with a non-referred group as part of the empirical study, where the results from the non-referred group could undergo the same reliability and validity study as in the referred group. An important limitation was that it was not possible to blind the group of non-referred and referred, which meant that the psychologists knew whether they were rating a referred or a non-referred child, which may have led to bias.

## Recommendations for Further Research

The item factor analysis that will be run by Hogrefe Ltd. once the data collection period is completed will enable further analysis of both the EDS-P and EDS-A and of how the EDS-P and the EDS-A can supplement each other. Once the standardization process has been completed, the scoring system has been developed, and the rewriting of the EDS-A is completed, new studies for reliability and validity should be conducted that also take aspects of the psychologist's agency and way of interacting with the child into consideration.

Further research may also reveal whether the EDS-P offers a suitable method for effect studies.

It will be necessary to consider if the focus of the EDS-A should be to assess the caregiver's understanding of the child's emotional vulnerabilities and capacities, to assess how the child is supported by important caregivers or to serve as a structured assessment aimed at revealing the difference between how the child expresses his or her emotional capacities in a calm, structured, safe setting compared to the child's reactions in ordinary and/or very demanding situations in everyday life. Further research may also reveal whether there is a stronger correlation between the EDS-P and the EDS-A for parents with non-referred children, rather than referred.

## Clinical Application

The EDS is designed to be performed by a trained psychologist to assist professionals in evaluating the child's emotional competencies and tailoring intervention plans. The assessment tool requires one assessment session, which means that it is not too demanding for the child to take part in the test. Also, most children found the assessment enjoyable, as many of the items consist of play. However, many extreme social vulnerable children did not want to participate in the retest study, perhaps because they found activities focused on intersubjectivity difficult and awkward.

The EDS may also offer an economic advantage for child psychiatric and social and educational services, as it can help to reduce the expense of interventions by tailoring the intervention to the child's zone of proximal emotional development. It may facilitate the assessment process by providing quick and valuable information for professionals in situations where it can be difficult to obtain in-depth details about the child's emotional capacity within a short period of time in order to design an intervention plan.

Finally, the EDS may be helpful in organizing the intervention according to the level of the child's competencies and fundamental difficulties. For instance, an intervention for a child with low scores on the autonomic level may emphasize bottom-up strategies, that is, experiential interventions. On the other hand, interventions for children with high scores on all three levels may profit from top-down interventions, such as cognitive behaviour therapy and mentalization-based treatment, which revolve around dialogues and reflections on emotional topics.

## Conclusion

The empirical study together with the preliminary ad hoc sample from Hogrefe Ltd. found that the EDS-P, but not the EDS-A, is a consistent, reliable and valid measure of 4–12-year-old's emotional development. There was a difference between referred and non-referred groups, especially on the autonomic and prefrontal levels; as expected, differences were also found between 4–8-year-olds and 9–12-year-olds. The referred group shows a progression or equality of levels between the autonomic, limbic and prefrontal mental organizations as measured on the EDS-P across all age groups and both genders. In the non-referred group, this progression is found on the autonomic and prefrontal levels across all age groups and both genders.

Despite the differences between the measurement tools, the empirical study revealed correlations between the level of the child's emotional functions, the parents' level of mentalizing and their intersubjectivity, although the findings were less straightforward than expected.

The results of the empirical study are promising regarding the EDS-P. This study

suggests that the EDS seems to offer a consistent measure of the emotional competencies and vulnerabilities of 4–12-year-olds and is suited for determining their emotional developmental age, although more research is needed.

# DANSK RESUME

## Baggrund

Et stigende antal børn henvises på grund af følelsesmæssige vanskeligheder til pædagogisk-psykologisk rådgivning (PPR) og til børnepsykiatrien på grund af psykiske vanskeligheder relateret til følelsesmæssig sårbarhed. For eksempel afslørede en amerikansk national undersøgelse af børns sundhed foretaget fra 2011 til 2012, at 16,5% af 3-17-årige havde en psykiatrisk diagnose. I Europa er der den samme tendens, fx var der i Danmark fra 2006 til 2016 en stigning på 91% i henvisninger til børne- og ungdomspsykiatrien.

Undersøgelser og vurderinger af børns følelsesmæssige udvikling, der er baseret på et teoretisk fundament, som integrerer tilknytningsteori, udviklingspsykologi, traumeteori og hjerneforskning, finder i stigende grad anvendelse inden for klinisk psykologi og familiebehandlingsarbejde. En af disse integrationer er neuroaffektiv udviklingspsykologi (NAU), som er udviklet med det formål at forstå og navigere i den komplekse verden af følelsesmæssig udvikling og intersubjektivitet mellem forældre og børn. Dette med henblik på at skabe relevante interventionsplaner for at imødekomme børns følelsesmæssige, personlighedsmæssige og sociale udvikling. NAU er en måde at forstå børns normale følelsesmæssige udvikling på og få indsigt i, hvordan denne udvikling kan fremmes eller forstyrres af relationelle problemstillinger (Hart, 2011). Inden for denne teoretiske ramme har forskeren (siden 2012 i samarbejde med kolleger) udviklet et måleredskab, Emotional Development Scale (EDS), til at vurdere 4-12-årige børns aktuelle følelsesmæssige funktionsniveau.

## Formål

Hovedfokus i den empiriske undersøgelse er at undersøge EDS' reliabilitet og validitet ved at måle funktioner, det vil sige kompetencer og sårbarheder, på tre forskellige niveauer af mental organisering – det autonome, det limbiske og det præfrontale niveau – som grundlag for at udvikle strukturerede og specifikke interventionsplaner og med henblik på at måle effekten af disse interventioner. For at undersøge validiteten af EDS er den korreleret med en vurderingsmetode, der måler intersubjektiviteten mellem barn og omsorgsperson, en metode der måler omsorgspersoners mentaliseringskapacitet samt to evidensbaserede standardiserede spørgeskemaer.

## Litteraturoversigt

Inden den empiriske undersøgelse blev indledt, blev der gennemført en litteratursøgning for at undersøge antagelsen om, at det er svært at finde

vurderingsmetoder, der fokuserer på følelsesmæssig udvikling. Litteraturoversigten viste, at det er relevant at udvikle en vurderingsmetode/test, der kan måle følelsesmæssig aldersspecifik udvikling, følelsesmæssige kompetencer og sårbarheder. Litteraturoversigten fokuserede på vurderingsmetoder/test rettet mod 4-12-årige børns følelsesmæssige udvikling, kompetencer og sårbarheder. En bloksøgning, en referencesøgning (snebold), en stikordssøgning og en nøgleordssøgning blev udført ved hjælp af søgemaskinerne Primo og Google Scholar. Derudover blev der udført en søgning i etablerede psykologiske testforlags kataloger samt en håndsøgning af psykologiske vurderingsmetoder og test, der anvendes i klinisk praksis. En Thesaurus-søgning blev brugt til at hjælpe med at finde synonymer til at definere nye søgeord ud over søgeord fundet gennem den teoretiske og empiriske litteratur samt de søgeordskombinationer, der blev fundet ved hjælp af boolske operatorer.

I litteratursøgningen fandt forskeren overvejende vurderingsmetoder, der består af selv/anden-rapportering via spørgeskemaer udfyldt af børn, forældre og/eller lærere, hvis svar omdannes til bedømmelsesskalaer. Dette tegner sig for 18 (60%) af de 30 metoder der blev fundet i litteratursøgningen. Der blev fundet otte præstationsprøver, der vedrører aspekter af følelsesmæssige kompetencer, men de vurderede ikke aspekter, der kunne indgå i en struktur til at vurdere følelsesmæssig udvikling. Med hensyn til præstationsprøver blev der ikke fundet nogen test, der inkluderede en teoretisk forståelse af mentale organiseringsniveauer omkring følelsesmæssig udvikling eller indeholdt skalaer, der måler det følelsesmæssige udviklingsniveau. Der blev heller ikke fundet vurderingsmetoder, der opdeler følelsesmæssige funktioner ud fra mentale organiseringer og vægter niveauer for følelsesmæssig udvikling bortset fra NMT (Perry & Hambrick, 2008; Mackinnon, 2012; Perry, 2008; Barfield et al., 2014).

**Undersøgelsesmetoder**

EDS består af EDS-Performance (EDS-P), som er en præstationsprøve, og EDS-Assessment (EDS-A), som er en struktureret vurdering bestående af to dele, der giver psykologen indsigt i barnets funktionsniveau vedrørende følelsesmæssige aspekter, der ikke kan måles gennem EDS-P. EDS-A er designet som et struktureret interview rettet mod forældre, omsorgspersoner eller fagfolk, der kender barnet godt. EDS-P og EDS-A er designet til at understøtte hinanden. EDS-P administreres i et struktureret setting, hvor psykologen udfordrer barnet gennem aktiviteter og stiller spørgsmål. Psykologen vurderer barnets evne til at håndtere aktiviteterne og vurderer barnets mentaliseringskapacitet ud fra kvaliteten af svarene. I gennemførelsen af EDS-A spørger man så mange informanter som muligt, der kender barnet godt, om barnets følelsesmæssige kompetencer og sårbarheder uden for den kliniske kontekst, og psykologerne vurderer scoringen ud fra svarene og deres kendskab til barnet.

EDS blev korreleret med den nyudviklede vurderingsmetode Neuroaffective

Mentalizing Interview (NMI) (for nylig omdøbt til Emotional Mentalizing Scale (EMS)), som er et struktureret interview til vurdering af voksnes mentaliseringskapacitet. NMI er baseret på et kort interview, der tager sigte på at udfordre den testede persons implicitte mentalisering, evne til at forbinde mentalt sprog med kropssprog samt synkroniseringskapacitet med intervieweren (Birck, Corlin, Hart & Hellborn, 2018). EDS blev også korreleret med Marschak Interaction Method (MIM), som er en struktureret legebaseret dyadisk observationsmetode, der tager sigte på at få indblik i kvaliteten og karakteren af forholdet mellem omsorgsperson og barn, dvs. intersubjektiviteten mellem omsorgsperson og barn. I den empiriske undersøgelse blev der udviklet psykometriske kvaliteter til vurderingsmetoden med en tilhørende ratingskala ud fra de fire dimensioner, der indgår i den kvalitative vurdering af MIM. I denne forbindelse blev MIM omdøbt til Marschak Interaction Method of Psychometrics (MIM-P). EDS'en blev ligeledes korreleret med Parent Stress Index (PSI) og Parent-Child Relationship Inventory (PCRI), som er to evidensbaserede, standardiserede, kliniske og forskningsbaserede selvrapporterede spørgeskemaer, der er beskrevet som en screening- og evalueringsmetode designet til at give et mål for forældres stress og at undersøge, hvordan omsorgspersoner ser på forældreopgaven, og hvordan de oplever deres barn.

## Forskningsspørgsmål

Afhandlingen undersøgte følgende forskningsspørgsmål:

I:
Hvad er EDS' psykometriske egenskaber, herunder reliabilitet og validitet af de autonome, limbiske, præfrontale og totale scores på EDS-P og EDS-A-skalaerne?

II:
Er sammenhængen mellem autonome, limbiske og præfrontale score for både EDS-P og EDS-A forudsigelig for følelsesmæssig udviklingsprogression som beskrevet i NADP?

III:
Hvad er sammenhængen mellem de testede børns følelsesmæssige udvikling, målt med EDS; forældre-barn-intersubjektivitet målt gennem Marschak Interaction Method of Psychometrics (MIM-P); og forældrenes mentaliseringskapacitet målt gennem Neuroaffective Mentalizing Interview (NMI)?

## Design og metode

Forskningsdesignet er baseret på et fixed design med kvantitative data og statistisk analyse. Det indgår i bestræbelserne på at udvikle og bringe mere strukturerede vurderingsmetoder baseret på NADP ind i det kliniske arbejde med henblik på at

tilvejebringe relevant struktureret information for at kunne tilrettelægge en interventionsplan (Poulsen & Simonsen, 2017). Forskningsdesignet anvender post-positivistiske videnskabelige metoder for at opnå reliable og valide fund, og det underliggende epistemologiske rationale bag undersøgelsen hviler på pragmatisme, det vil sige en interesse for praktiske forhold, der styres af praktiske erfaringer snarere end udelukkende af teori (Coolican 2009; Phillips & Burbules, 2000; Robson & McCartan 2016).

Undersøgelsen fokuserer på interrater-reliabilitet, test-retest-reliabilitet, 'internal consistency' samt 'concurrent', 'predictive' og 'construct' validitet af EDS-P og EDS-A. Da EDS er udviklet i samarbejde med Hogrefe Ltd., er deres ad hoc-afprøvning (n = 213) korreleret med de empiriske data med hensyn til 'concurrent' og 'predictive' validitet. Ad hoc-afprøvningen fra Hogrefe Ltd. er ikke en del af den empiriske undersøgelse, og kun data, der viste sig at være relevante for at kunne belyse visse aspekter af den empiriske undersøgelse, blev inkluderet. Undersøgelsen af 'concurrent' validitet består af en analyse mellem ikke-henviste og henviste for at undersøge forskellen mellem de to grupper sammen med alders- og kønsforskelle. Undersøgelsen af 'predictive validity' blev brugt til at undersøge progressionen mellem de autonome, limbiske og præfrontale niveauer. Den blev udført ved at sammenflette resultaterne fra den empiriske undersøgelse og ad hoc afprøvningen fra Hogrefe A/S. Denne analyse blev udført ved at beregne gennemsnitsværdien baseret på procentdelen af max scores. Scorerne blev analyseret på tværs af alder og aldersgrupper – 4-8-årige og 9-12-årige – og på tværs af køn. Da der ikke blev fundet måleredskaber, der matchede det eksklusive fokus på følelsesmæssig udvikling, blev 'construct' validiteten analyseret ved at korrelere EDS med MIM-P, NMI, PSI og PCRI.

**Dataindsamling og analyse**

Undersøgelsens deltagere var 36 børn i alderen 4-12 år, som hver deltog sammen med en af deres forældre; alle børn og forældre var forud for udvælgelsen blevet henvist til et dagfamiliebehandlingscenter på grund af familiemæssige vanskeligheder. Børnenes gennemsnitlige alder var 8,58 år (SD = 2,16), drenge; 54,3 %, piger; 45,7 %. Forskeren tilstræbte at overholde alle etiske regler og overvejelser. Da familierne blev anset for at være i en sårbar situation, idet de var henvist til et familiecenter, blev de behandlet med høj grad af respekt og givet så mange oplysninger som muligt uden at overvælde dem med for meget eller alt for kompliceret information. Hvis de henviste forældre afviste at deltage i undersøgelsen, blev dette respektfuldt accepteret. Børnene og forældrene blev rekrutteret i begyndelsen af deres ophold på familiebehandlingscentret. Det henviste barn gennemførte EDS-P sammen med psykologen; barnets mor eller far deltog med barnet i MIM-P, blev interviewet til NMI og EDS-A og gennemførte de standardiserede spørgeskemaer (PSI & PCRI).

Otte dagfamiliebehandlingscentre placeret geografisk forskellige steder i Danmark,

som mindst havde to psykologer til at administrere testningen, var medtaget i undersøgelsen. Atten psykologer deltog i det eksperimentelle design. De samme to psykologer på hvert familiebehandlingscenter, der var ansvarlige for rekruttering af familierne, havde også ansvaret for at gennemføre og score vurderinger/tests. For at sikre interrater-reliabilitet blev EDS-P, NMI og MIM-P videooptaget for at kunne foretage "blinded ratings". For at sikre test-retest-reliabilitet blev retesten af EDS-P gennemført inden for en til syv uger, før interventionen blev implementeret. I forbindelse med validitetsundersøgelsen blev alle vurderingsmetoder/tests udført, før interventionen begyndte.

Alle deltagere i den empiriske undersøgelse var henviste, mens 86,6 % i ad hoc-afprøvningen (n=213) fra Hogrefe Ltd. var ikke-henviste, hvilket gjorde det muligt at korrelere EDS med en henvist og en ikke-henvist gruppe.

**Resultater**

Der var en signifikant, positiv sammenhæng mellem psykolog 1 og 2's scoringer i EDS-P, hvilket tyder på en stærk enighed mellem raterne. En signifikant positiv korrelation blev fundet i test-retest-analysen af EDS-P, hvilket indikerer en stærk sammenhæng mellem den første og den anden testning af barnet. EDS-P ser ud til at have god 'internal consistency': Cronbachs alpha = .838. Sammenhængen mellem scoringer varierede fra .727 til .973, $p < .001$. EDS-A ser ligeledes ud til at have god 'internal consistency': Cronbachs alpha = .874. Sammenhængen mellem scoringer varierede fra .809 til .952, $p < .001$. De fire forskellige scores i henholdsvis EDS-P og EDS-A (autonome, limbiske, præfrontale og totale) synes at have god 'internal consistency': Cronbachs alpha = .813. Sammenhængen mellem scoringer varierede fra .084 til .400.

I sammenligningen af ligheder og forskelle mellem henviste og ikke-henviste grupper blev to kontrolvariabler fra demografiske data – køn og alder – analyseret. 'Independent sample t-test' afslørede ingen signifikant forskel mellem de henviste og ikke-henviste grupper vedrørende alder og køn. Ved sammenligning af henviste og ikke-henviste grupper afslørede 'independent sample t-test' en signifikant forskel mellem de henviste og ikke-henviste på alle tre niveauer samt den samlede score på både EDS-P og EDS-A. 'Independent sample t-test' afslørede betydelige forskelle mellem gruppen af henviste og ikke-henviste 4-8-årige i form af scoringer på det autonome, præfrontale og total score på EDS-P. På det limbiske niveau var der ingen signifikant forskel ($p = \geq 0{,}05$). 'Independent sample t-test' og Mann-Whitney U test afslørede signifikante forskelle mellem henviste og ikke-henviste 9-12-årige ud fra af scoringer på autonome, limbiske, præfrontale og total score. 'Independent samples t-test' afslørede en udvikling i følelsesmæssige kompetencer mellem 4-8-årige og 9-12-årige i både den ikke-henviste og den henviste gruppe vedrørende EDS-P, selvom udviklingen var større for den ikke-henviste sammenlignet med den henviste gruppe.

'Independent sample t-test' afslørede betydelige forskelle mellem grupperne af henviste og ikke-henviste piger på scoringer på både det autonome, præfrontale og i den totale score. På det limbiske niveau var der ingen signifikant forskel ($p \leq 0,05$). 'Independent sample t-test' afslørede betydelige forskelle mellem grupper af henviste og ikke-henviste drenge med hensyn til scores på alle niveauer.

Undersøgelsen af 'predictive validity' peger på en progression eller ensartede scores mellem de autonome, limbiske og præfrontale mentale organiseringer på tværs af aldersgrupper og køn. Det samme klare resultat blev ikke fundet for gruppen af ikke-henviste på grund af et lavt limbisk niveau på EDS-P og et højt limbisk niveau på EDS-A. Undersøgelsen af forskellene mellem EDS-P og EDS-A tyder på, at i gruppen af henviste børn er gennemsnitsscoren i EDS-A lavere end i EDS-P, men i gruppen af ikke-henviste børn er gennemsnitsscoren højere i EDS-A end i EDS-P.

Pearsons korrelationskoefficienter viste en forventet signifikant forventet negativ, men moderat sammenhæng mellem EDS-P og PSI samt en signifikant moderat, ikke forventet negativ korrelation på nogle få punkter mellem PCRI- og EDS-scores. Der blev ikke fundet korrelationer og signifikans mellem EDS-P, EDS-A og NMI. Pearsons korrelationskoefficienter viste signifikante og moderate korrelationer mellem scores på MIM-P og EDS for 4-8-årige og for 9-12-årige. Flere signifikante og moderate korrelationer blev fundet mellem MIM-P- og EDS-scores i drengegruppen. Der blev ikke fundet korrelationer mellem EDS-P/EDS-A og MIM-P i pigegruppen. Pearsons korrelationskoefficienter viste mange signifikante og moderate korrelationer mellem MIM-P- og NMI-scores.

## Diskussion

Undersøgelsen viste, at EDS blev administreret på en konsekvent og stabil måde med standardiserede procedurer og gode psykometriske egenskaber. Denne undersøgelse sammen med standardiseringsproceduren implementeret af Hogrefe Ltd. betyder, at EDS bevæger sig et skridt tættere på publikation.

Hvis EDS indfanger emotionel udvikling på det limbiske niveau vil resultatet i EDS-P kunne pege på nogle interessante resultater med hensyn til vesteuropæisk kultur. For eksempel var forskellen mellem henviste og ikke-henviste meget svagere på det limbiske niveau sammenlignet med de autonome og præfrontale niveauer. Dette kunne afspejle, at årsagerne til henvisning ikke er forbundet med kompetencer eller sårbarheder på det limbiske niveau, men har mere at gøre med sårbarheder og selvreguleringsproblemer i forbindelse med autonome og præfrontale funktioner. Uventet, måske relateret til manglen på tilstrækkelig træning af psykologerne, blev EDS-A mest behandlet som en vurdering af forældrenes indre repræsentationer af barnet. Manglen på 'internal consistency' mellem EDS-P og EDS-A kan afspejle, at forældre reagerer på barnets adfærd, og at det kan være svært for dem at bedømme deres børn korrekt. Både præstationsprøven og den strukturerede vurdering er rettet mod at vurdere funktioner på de tre følelsesmæssige niveauer: autonom, limbisk og

præfrontal. Analysen af forskellene mellem EDS-P og EDS-A scorerne viste, at forældrenes indre repræsentationer i gruppen af henviste havde mere negativ bias, og at der i gruppen af ikke-henviste var mere moderat til meget positiv bias med hensyn til barnets følelsesmæssige kompetencer. Dette kunne tyde på, at hvis forældre ikke har nogen grund til bekymring for deres barn, oplever de barnet som velreguleret med høje følelsesmæssige kompetencer, og hvis de har problemer med barnet, eller måske selv er i følelsesmæssig ubalance, måske relateret til årsagerne til henvisningen til familiebehandling, opfatter de deres barn i et mere negativt lys. Det kan også tyde på, at de ikke-henviste børns forældre, i modsætning til de henviste børns forældre, er i stand til at ændre deres indre repræsentationer i overensstemmelse med barnets modningsproces, eller at deres indre repræsentationer har en positiv bias.

Resultatet antyder, at den store gruppe af ikke-henviste børn har højt udviklede præfrontale kompetencer, men ikke nødvendigvis høje limbiske kompetencer. Dette kan skyldes krav i vesteuropæiske samfund, der lægger stor vægt på evnen til selvregulering, udføre viljeshandlinger og udøve impulshæmning, hvilket prioriterer en stimulering af præfrontale strukturer gennem undervisning (Rybanska, McKay & Jong, 2017). Ifølge Choudhury (2010) kræver det veludviklede præfrontale funktioner at trives i et vesteuropæisk samfund. Dette kan resultere i et overdrevet fokus på at fjerne følelsesmæssige problemer gennem psykiatrisk diagnosticering og medicinering (Brinkman, 2016; Jørgensen, 2012).

Fraværet af signifikante korrelationer mellem EDS og NMI antyder, at der ikke er nogen sammenhæng mellem de henviste forældres mentaliseringskapacitet og barnets følelsesmæssige udvikling og kompetencer målt gennem EDS-P. Dette var et uventet fund, da megen forskning har fundet en sammenhæng mellem tryg tilknytning og høj mentaliseringskapacitet (Katzenelson, 2015; Sleede, 2013). Det kan afspejle, at børn med alderen er mere påvirket af samspillet med omgivelserne uden for familien i forhold til deres følelsesmæssige udvikling, det vil sige samspillet med andre familiemedlemmer ud over deres forældre, herunder jævnaldrende, lærere osv. Barnets egen evne til selvregulering spiller også en vigtig rolle i denne henseende.

Der blev fundet mange signifikante og moderate korrelationer mellem forælderens mentaliseringskapacitet og MIM-P omkring forældredimensioner. Dette fund kan tyde på, at forældrenes mentalisering af barnet har stor betydning for deres evne til at skabe en atmosfære af fælles intersubjektivitet. Det kan afspejle, at kvaliteten af intersubjektiviteten mellem forældre og barn er mere afhængig af forældrenes mentaliseringskapacitet end af barnets følelsesmæssige udvikling og kompetencer. Ud fra et NADP-perspektiv viste resultaterne en sammenhæng mellem barnets følelsesmæssige udvikling, forældrenes mentaliseringskapacitet og forælder-barn-interaktion.

**Begrænsninger**

Adskillelige begrænsninger vedrørende den foreliggende undersøgelse anerkendes

fuldt ud. En større population ville muliggøre en mere valid normal beregning. Denne kendsgerning sammen med den begrænsning, der ligger i kun at foretage et kvantitativt studie, og fraværet af en ikke-henvist kontrolgruppe begrænser resultaternes generaliserbarhed. Endelig var det ikke muligt at træne psykologerne korrekt i de forskellige undersøgelsesmetoder, der blev anvendt i undersøgelsen, hvilket synes at have været særligt bekymrende med hensyn til EDS-A.

Atten psykologer var involveret i undersøgelsen af interrater-validitet, men undersøgelsen blev udført parvis, da kun to psykologer var involveret i en given bedømmelse på grund af de begrænsede ressourcer i dette forskningsprojekt og den uoverskuelige mængde tid, det ville have krævet at have yderligere psykologer til at rate hver enkelt afprøvning.

Det ville have været gavnligt at gennemføre et eksperimentelt design med et randomiseret kontrolforsøg ved hjælp af en kontrolgruppe, fx med en ikke-henvist gruppe som led i den empiriske undersøgelse, hvor resultaterne fra den ikke-henviste gruppe kunne undergå samme reliabilitets- og validitetsstudie som den henviste gruppe. En vigtig begrænsning var, at det ikke var muligt at blinde gruppen af ikke-henviste og henviste, hvilket betød, at psykologerne vidste, om de vurderede et henvist eller et ikke-henvist barn. Dette kan have haft betydning for deres vurdering af scoringerne.

## Anbefalinger til yderligere forskning

Item-faktoranalysen, som udføres af Hogrefe Ltd., når dataindsamlingsperioden er afsluttet, vil muliggøre yderligere analyse af både EDS-P og EDS-A og af, hvordan EDS-P og EDS-A kan supplere hinanden. Når standardiseringsprocessen er afsluttet, scoringssystemet er udviklet og omskrivningen af EDS-A er udført, skal der udføres nye undersøgelser af reliabilitet og validitet, der også inddrager aspekter af psykologens agens og måde at interagere med barnet på.

Yderligere undersøgelser kan også vise, om EDS-P kan anvendes i effektundersøgelser.

Det vil være nødvendigt at overveje, om EDS-A skal fokusere på omsorgspersonens forståelse af barnets følelsesmæssige sårbarheder og evner, for at vurdere, hvordan barnet bedst støttes af vigtige omsorgspersoner, eller om skalaen skal fungere som en struktureret vurdering med det formål at undersøge forskellen på, hvordan barnet udfolder sin følelsesmæssige kapacitet i en rolig, struktureret, tryg sammenhæng, og barnets følelsesmæssige reaktioner i et dagligdags miljø og/eller i kravsættende situationer i hverdagen. Yderligere forskning kan også afsløre, om der er en stærkere sammenhæng mellem EDS-P og EDS-A for forældre med ikke-henviste frem for henviste børn.

## Klinisk anvendelse

EDS er designet til at blive udført af en oplært psykolog til at hjælpe fagpersoner med at evaluere barnets følelsesmæssige kompetencer og "skræddersy" interventionsplaner. Vurderingsmetoden kræver én konfrontationssession, hvilket betyder, at det ikke er for krævende for barnet at deltage i testen. De fleste børn fandt vurderingen sjov, da mange af delprøverne består af leg. Imidlertid afviste mange børn med alvorlige kontaktforstyrrelser at deltage i retesten, måske fordi de fandt aktiviteter rettet mod intersubjektivitet vanskelige og akavede.

EDS kan også tilbyde en økonomisk fordel for børnepsykiatrien og pædagogisk-psykologiske rådgivninger (PPR), da den kan bidrage til at reducere udgifterne til interventioner ved at "skræddersy" interventionen til barnets nærmeste følelsesmæssige udviklingszone. Det kan lette vurderingsprocessen ved at give hurtig og værdifuld information til fagfolk i situationer, hvor det kan være svært at få dybtgående detaljer om barnets følelsesmæssige kapacitet på kort tid i tilrettelæggelsen af interventionsplanen.

Endelig kan EDS være en hjælp til at organisere interventionen i forhold til niveauet af barnets kompetencer og grundlæggende vanskeligheder. For eksempel kan en intervention for et barn med lave scores på det autonome niveau lægge vægt på bottom-up-strategier, det vil sige oplevelsesorienterede interventioner, mens interventioner til børn med høje scores på alle tre niveauer med fordel kan anvende top-down-interventioner såsom kognitiv adfærdsterapi og mentaliseringsbaseret terapi, der drejer sig om dialoger og refleksioner om følelsesmæssige emner.

## Konklusion

Den empiriske undersøgelse sammen med ad hoc-afprøvningen fra Hogrefe Ltd. viste, at EDS-P, men ikke EDS-A, er en reliabel og valid vurderingsmetode til at måle 4-12-årige børns følelsesmæssige udvikling. Der var forskel mellem henviste og ikke-henviste grupper, især på de autonome og præfrontale niveauer; som forventet blev der også fundet forskelle mellem 4-8-årige og 9-12-årige børn. I den henviste gruppe peger resultatet på en progression eller ensartede niveauer mellem de autonome, limbiske og præfrontale mentale organiseringer målt igennem EDS-P for alle aldersgrupper og begge køn; i den ikke-henviste gruppe viser resultatet en progression på det autonome og præfrontale niveau.

På trods af forskellene mellem de forskellige vurderingsmetoder viste det empiriske studie sammenhæng mellem barnets følelsesmæssige niveauer, forældrenes mentalitetsniveau og deres intersubjektivitet, selv om resultaterne var mindre entydige end forventet.

Resultaterne af den empiriske undersøgelse er lovende med hensyn til EDS-P. Dette studie tyder på, at EDS kan tilbyde en pålidelig metode til at måle følelsesmæssige

kompetencer og sårbarheder hos 4-12-årige børn og er egnet til at bestemme deres følelsesmæssige udviklingsalder, selvom mere forskning er nødvendig.

# ACKNOWLEDGEMENTS

This PhD thesis represents the culmination of a process that began exactly three decades ago, in 1998. In those days my interest in interpersonal neurobiology, attachment and trauma theory and developmental psychology had reached a phase, where I wanted to dig deeper by conducting an empirical study, combined with my work as a director of a municipal day-family-care treatment centre. I was able to secure a grant from the Ministry of Social Affairs in Denmark to conduct this study. Unfortunately, the grant was related to my job at the municipal family treatment centre, and due to organizational restructuring there, I applied for a new job in child psychiatry, and with that, the grant was lost. In 2000, while I was working in child psychiatry, the administrative consultant psychiatrist helped me to apply for a grant from the Danish Ministry of Health, but all applications were turned down.

In 2008, 2009 and 2013, I made renewed attempts to arrange a research study. Thus, I was very happy and grateful when Professor Ann Bygholm, head of the Doctoral School at the Faculty of Humanities at Aalborg University, in 2015 approved my enrolment in a doctoral study, waiving the requirement to earn ECTS points or participate in other professional environments. Despite her generous offer, I was unsure about the right way to design a PhD study, so I contacted Associate Professors Ulla Holck and Stine Lindahl Jacobsen at the Music Therapy Programme in the Department of Communication and Psychology at Aalborg University. They generously offered to enroll me in their international research programme, including guidance throughout the process and semi-annual PhD courses taught by guest lecturers. After a dialogue with Professor Hanne Mette Ochsner Ridder, Department of Communication, Aalborg University, it was not difficult for me to decide to write a doctoral application to the Music Therapy Programme, which was granted. I asked Professor of Psychology at Aalborg University Bo Møhl to become my main supervisor, and a little later in the process, Stine Lindahl Jacobsen was asked to be my secondary supervisor. Fortunately, they both agreed. Both Bo Møhl and Stine Lindahl Jacobsen have provided invaluable support as supervisors throughout the process of this doctoral study.

Stine shares my passion for psychological assessments and for achieving high standards of reliability and validity. She was assigned as my secondary supervisor in a perfectly timed process, as I was about to initiate my empirical study, and after I had gathered the results of the research study she provided invaluable help in my analysis of the data, while I was struggling to understand and use statistics. Prior to this study I did not have any experience in statistical analysis, and I would certainly not have been able to handle the task without Stine's warm, caring support and excellent supervision. Later in the study, my supervisor and secondary supervisor switched roles, so Stine became my main supervisor. She has guided me as my precious guardian angel in a very laborious supervision process, including 'translating' harsh

comments from blinded peer-reviewers.

In realizing this PhD study, I therefore first and foremost thank my supervisors, Bo Møhl and Stine Lindahl Jacobsen, who have been with me from the very beginning and during the darkest moments of my project. Hanne Mette Oschner Ridder was also right there beside me, supporting and protecting me every time I had difficulty living up to the expectations of delivering reports, time tables and templates on time and rescued me whenever I missed a deadline. Both Bo Møhl and Stine Lindahl Jacobsen showed tremendous patience with me throughout the process of writing articles to be peer-reviewed and were so supportive in reading my endlessly long manuscripts, pointing out where they might be abbreviated to meet the formal requirements of journals for acceptance and peer-reviewing. They also kept me in line throughout the difficult process of writing the dissertation, which is so different from writing a textbook.

Thanks to Bo Møhl's and Stine Lindahl Jacobsen's invaluable help, I was able to succeed in combining the worlds of research, and practice, and the overall atmosphere of the group of PhD students and supervisors at the doctoral programme in music therapy has been an indispensable source of knowledge, reflection and respectful support. The semi-annual courses always left me recharged and full of motivation to see how it is possible to create a holding environment with no feeling of pressure and competition. Hanne Mette Ridder's way of enabling this environment to flourish is impressive and indescribable.

Regarding the empirical study I would like to thank the psychologists at the participating family care centres and the heads of the all the eight family centres, who so willingly agreed to let their psychological staff take part in my doctoral study, which was very time-consuming for them. I thank both them and the participating psychologists for their dedicated participation. Also, millions of thanks to all the parents and children who willingly participated in the study. They were absolutely essential and crucial for the study, and I owe them my deepest gratitude.

Without the support of my colleagues and friends in clinical psychological practice throughout all these many years, this doctoral study would not have been possible. At this point, I would like to thank my good colleagues and friends, especially Marianne Bentzen and Rikke Schwartz, and not to forget Dorte Herholdt Silver, who turned my written English language into something not only readable but elegant.

Lastly, I want to thank my own family. My husband, for his unconditional and vital love, trust and support, especially when my technical devices and software programs broke down, and he was always there to lend a helping hand. To my two children, Mick and Liv, who are now adults and no longer live at home, for their unconditional love, across time and space, and their patience with me for all the years while I pursued my passion for psychology and the time-consuming process of writing, co-writing or

editing 14 textbooks, which took away from my ability to be the mother I really wanted to be. I am both humble and so thankful for what I have been given in life.

# TABLE OF CONTENTS

# TABLE OF FIGURES



# TABLE OF TABLES

# LIST OF PAPERS

Hart, S. & Jacobsen, S.L. (2018) The neuroaffective triangle and organizing intervention in family therapy and psychotherapy – A new conceptual framework for family therapy. Manuscript submitted for publication.

Hart, S. & Jacobsen, S. L. (2018b). Zones of proximal emotional development – Psychotherapy within a neuroaffective perspective. *J. Infant, Child, and Adolescent Psychotherapy*, *17*(1), 28-42, doi: 10.1080/15289168.2018.1425588.

Hart, S. & Jacobsen, S.L. (2018) Emotional Development Scale: Assessing 4–12-year olds' emotional capacity. Manuscript submitted for publication.

# ABBREVATIONS

AAI = ADULT ATTACHMENT INTERVIEW

EDS = EMOTIONAL DEVELOPMENT SCALE

EDS-P = EMOTIONAL DEVELOPMENT SCALE-PERFORMANCE

EDS-A = EMOTIONAL DEVELOPMENT SCALE-ASSESSMENT

EMS = EMOTIONAL MENTALIZING SCALE

NADP = NEUROAFFECTIVE DEVELOPMENTAL PSYCHOLOGY

NMI = NEUROAFFECTIVE MENTALIZING SCALE

MIM = MARSCHAK INTERACTION METHOD

MIM-P = MARSCHAK INTERACTION METHOD-PSYCHOMETRICS

PSI = PARENT STRESS INDEX

PCRI = PARENT-CHILD RELATIONSHIP INVENTORY

RF-SCALE = REFLECTIVE FUNCTIONING SCALE

# CHAPTER 1. INTRODUCTION

## 1.1 INTRODUCTION

The purpose of this dissertation is to investigate the reliability and validity of the newly developed assessment tool the Emotional Development Scale (EDS), correlating it with two other newly developed assessment tools, the Marschak Interaction Method (MIM-P) and the Neuroaffective Mentalizing Interview (NMI), and with two standardized validated assessment tools, the Parent Stress Index (PSI) and the Parent-Child Relationship Inventory (PCRI). In this introduction the focus of the empirical study is contextualized. This presents the background and motivation and the research questions. Also in this first chapter, the terminology and definition of central constructs and their specific uses are stated. Lastly, a description of the design and methodology and overview of the dissertation is presented.

## 1.2 BACKGROUND AND MOTIVATION

In our society there seems to be an increasing focus on children's social, emotional and personality development and difficulties. The understanding of how children are affected by their relationships was moved forward by the work of, among others, Donald Winnicott and John Bowlby, who developed theories of attachment and the importance of intersubjectivity. In Denmark, the focus on children's mental and physical well-being, and how it is related to attachment issues, has resulted in many resources being allocated on the national budget every year to support children's development, for example through family intervention (Hart & Schwartz, 2008).

This focus has also led to a far greater number of children being referred to the Danish regional educational-psychological advisory services and to child psychiatric services due to emotional dysfunctions. From 2006 to 2016 there was a 91% increase in referrals to child and adolescent psychiatric services in Denmark (Danish Regions, 2017). Since the late 1800s, there has been a strong focus on assessing children's cognitive development, and since the early 1900s, there has been a dedicated effort to define and measure intelligence. Today, we have well-documented knowledge about human cognitive development processes and the cognitive neural structures underlying specific cognitive capacities (Varela, Thomson & Rosch, 2016). The design of IQ tests led to the development of psychometrics, which has made intelligence measurable and quantifiable and has enabled us to develop assessment methods aimed at identifying children's intellectual developmental level in both general and specific terms (Karpatschof, 2011). Together with the development of IQ tests there has been many discussions, debates and critique of the concept of intelligence and the development of IQ tests. All tough IQ tests are widely used, still today there are many disagreements (Eysenck, 2017).

Since 2012, the researcher, in cooperation with colleagues, has developed a measurement tool to assess children's emotional development, their emotional capacities and vulnerabilities and the benefit of child interventions aimed at emotional development, as it has proven difficult to find emotional measurement tools that focus on emotional development from a theoretical base of developmental psychology and include a performance test. Getting a nuanced picture in a short period of time is difficult.

## 1.3 CONTEXT FOR THE EMPIRICAL STUDY

Since 1988, the researcher has worked as a psychologist with adult, child and family therapy, both as head of a municipal family treatment centre and a child psychiatric ward. In addition, she has worked as a private practitioner including conducting parental capacity assessments. Since the mid-1990s, in collaboration with psychotherapist Marianne Bentzen, she has developed the theoretical framework neuroaffective developmental psychology (NADP) as a navigation tool for understanding human personality development. With, among others, psychologists Rikke Schwartz, Jesper Birck and Knud Hellborn, she has developed assessment methods/tests using the NADP framework in relation to emotional and mentalizing tests and family observations. In addition, the researcher has developed a parenting and a children's group programme and authored, co-authored and edited 14 books on NADP and on psychological trauma and dissociation.

This empirical study is based on the development of the Emotional Development Scale (EDS), which itself is based on NADP. NADP integrates neuroscience with trauma research, attachment theory and developmental psychology and is based on a perspective that personality development takes place in an interaction of genetic dispositions, neural development and reciprocity in caregiving relationships. This process takes place in the child's zone of proximal emotional development. Higher psychological functions – emergent functions that are under development – are internalized through human interactions within the zone of proximal development (Vygotsky, 1978; Hart, 2008; 2011). The EDS is a theoretically based assessment method aimed at identifying the psychological intervention that is best suited to promoting the child's emotional development and self-regulation capacities.

NADP is very much inspired by attachment theory and the concept of a secure base as a foundation for emotional development. Ainsworth expanded attachment theory by introducing a typology of secure or insecure attachment patterns. Attachment research has shown that these patterns impact the child's basic affect regulation capacity and his or her development of mentalization capacity (Ainsworth, Blehar, Waters Wall, 1978; Fonagy, 2009; Fonagy et al., 2007). Studies have also found that the development of attachment patterns is based on synchronization capacity between infants and caregivers (Stern, 2000; Aitken & Trevarthen, 1997). There is sufficient research to believe that there is a correlation between a child's emotional

competencies and synchronization processes between the child and caregiver, which in turn relates to the caregiver's mentalization capacity. That assumption is what underpins the development of the Neuroaffective Mentalizing Interview (NMI) (which was recently renamed the Emotional Mentalizing Scale (EMS)) as a measurement tool to assess parents' mentalization capacity and the Marschak Interaction Method of Psychometrics (MIM-P) as a measurement tool to assess the intersubjectivity between caregiver and child.

## 1.4 THE PURPOSE OF THE EMPIRICAL STUDY

The main focus of the empirical study is to investigate the reliability and validity of the EDS. The EDS intends to assess 4–12-year-old children's emotional development, capacity and vulnerability as a basis for devising specific intervention plans. To examine the validity of the EDS, it is correlated with a tool measuring the intersubjectivity between child and caregiver, the MIM-P, a newly developed tool for measuring the caregiver's mentalizing capacity, the NMI, and two evidence-based standardized questionnaires, the Parent Stress Index (PSI) and the Parent-Child Relationship Inventory (PCRI).

## 1.5 RESEARCH QUESTIONS

The present study examines the following research questions:

I:
What are the psychometric properties of the EDS, including reliability and validity of the autonomic, limbic, prefrontal and total scores in the EDS-P and EDS-A scales?

II:
Is the correlation between autonomic, limbic and prefrontal scores on both the EDS-P and the EDS-A predictive of emotional developmental progression as described in NADP?

III:
What is the correlation between the tested children's emotional development as measured with the EDS; parent-child intersubjectivity, as measured with the Marschak Interaction Method of Psychometrics (MIM-P); and parental mentalizing capacity, as measured with the Neuroaffective Mentalizing Interview (NMI)?

## 1.6 EMPIRICAL STUDY

The key focus of the empirical study is to investigate the reliability and validity of the EDS as a clinical assessment tool, mainly through correlation analyses.

The empirical study conducted for this dissertation consists of 36 children, aged 4–12 years, along with one of their parents, who have been referred to a day-family-

treatment centre due to family-related difficulties prior to the selection. Included are eight day-family-treatment centres from various parts of Denmark, each of which had a minimum of two psychologists, who handled the uptake.

The EDS is developed in collaboration with Hogrefe Ltd., which is in charge of investigating internal validity through factor analysis in a larger sample group with the aim of establishing norms for the EDS. In the current empirical study, the preliminary ad hoc sample (n=213) from Hogrefe Ltd. is correlated with the empirical data. The psychometric analysis of the empirical data includes interrater reliability, test-retest reliability and internal consistency. In the analysis of non-referred and referred groups, the preliminary dataset from the Hogrefe Ltd. sample is included ad hoc to analyse concurrent and predictive validity, and differences between the referred and non-referred groups are analysed. The preliminary ad hoc sample from Hogrefe Ltd. is not a part of the empirical study, and only data that are found to be relevant to elucidate certain aspects of the empirical study are included. This approach was considered possible, as the psychologists involved in the preliminary ad hoc sample from Hogrefe Ltd. and in the empirical study received the same training. None of the results from the Hogrefe Ltd. sample have yet been published, and in agreement with Hogrefe Ltd. the ad hoc data from this sample were analysed by the researcher.

## 1.7 RESEARCH DESIGN AND METHODOLOGY

The research design focus on scale development and consists of a fixed design with quantitative data and statistical analysis. The study design incorporates post-positivist scientific methods in order to produce reliable and valid findings (Coolican 2009). Further, the underlying attitude behind the study rests on pragmatism, that is, a concern for practical matters guided by practical experiences rather than solely by theory (Robson & McCartan 2016).

The empirical study consists of correlational investigations of the EDS. Regarding external validity, the EDS is correlated with two evidence-based questionnaires, the Parent Stress Index (PSI) and the Parent-Child Relationship Inventory (PCRI), and two non-validated measurement tools regarding parent-child interaction (MIM-P) and parental mentalizing capacity (NMI). The analyzed data consists of video recordings, performance tests, structured evaluation, structured assessment and standardized questionnaires. The research design and the practical execution of the empirical study are further elaborated in Chapter 5.

## 1.8 THE BASIC FOUNDATION AND TERMINOLOGY OF NADP

The EDS, MIM-P and NMI rest on research-based knowledge about the emotion-regulating structures in the human brain, studies of attachment in developmental psychology (Stern 2000; 2004; Trevarthen, 2005; 2017; Beeghly, Perry & Tronick, 2016), developmental psychopathology (Sroufe, 2005; Sroufe, Egeland, Carlson &

Collins, 2005; Rutter & Sroufe, 2000; 1997; Cicchetti & Curtis, 2006; Cicchetti, 2015), trauma research (van der Kolk 2014) and interpersonal neurobiology (Schore 2016). These authors argue that basic affect regulation develops from birth in a close interaction between caregiver and child. The development of synchronization and emotional attunement processes within the first year of life lays the foundation for the child's attachment pattern and emotional development. In addition, there has been intensive research into the connection between neuroaffective processes and developmental psychology and trauma (Perry, 2001; 2002). The terminology used in the dissertation is thus derived from attachment theory, developmental psychology, trauma research and brain research within the framework of NADP, which is elaborated in Chapter 2 and forms the foundation of the empirical study. In the following, some key concepts employed in the dissertation are defined.

### 1.8.1 DEFINITION OF EMOTIONAL MENTAL ORGANIZATION

The concept of levels of mental organization is based on neurologist Hughlings Jackson's (1958) idea that over millions of years of evolution, newer, higher-order centres in the nervous system have developed on top of lower-seated, older sections, "from the bottom up" and "from the inside out", with higher centres emerging as superstructures to lower and older structures. Another important contribution is the neurologist MacLean's (1970, 1990) description of the human brain as a hierarchy of functional levels, where structures that develop early in life, through separate developmental stages, become subordinate to later-developing structures in a process that increases the complexity of the brain. MacLean introduced the so-called triune brain model, which is described and elaborated in Paper 2 (see Chapter 2). In short, it depicts the human brain as a three-tiered structure with closely interconnected levels. MacLean attributed the three brain structures with three forms of mentation, with proto-mentation as the most primitive, emotomentation as the middle level and ratiomentation as the top level (Hart, 2008). The area labelled protomentation in MacLean's model is referred to as the autonomic, sensory level of organization in NADP. The area labelled emotomentation in MacLean's model is referred to as the limbic, emotional level of organization in NADP. The area labelled ratiomentation in MacLean's model is referred to as the prefrontal, rationally mentalizing level of organization in NADP.

Mental functions organize through neural systems that all play together, and each plays a different role. In separate developmental stages, each higher level represents and extends at a more complex level, resulting in increased differentiation (Beebe & Lachmann, 2002; Perry, 2002; Schore, 2016). As development progresses, former types of behaviour are hierarchically integrated into more complex forms. In distinct development phases, structures that develop early in life are progressively superseded by later-maturing structures, adding to the brain's complexity (Schore, 2016). The EDS is sculptured from the understanding that emotional development happens through the progressive development of mental organization.

### 1.8.2 DEFINITION OF EMOTIONAL COMPETENCY

The concept of emotional competency/capacity is closely linked to the concept of mental organizations. In NADP, they are conceptualized on the three hierarchical levels defined by Maclean:

On the autonomic level, emotional competency involves the capacity to sence pleasure and displeasure, to avoid and approach and to regulate arousal and maintain awareness through body sensations (Damasio, 1998). Another important aspect on this level is the capacity to synchronize with others through imitation and body sensations (Stern, 2000; Trevarthen & Panksepp, 2014).

On the limbic level, emotional competency refers to the ability to alternate between feelings that are perceived as positive and negative and to engage in social interactions, such as playfulness, joy, anger and sadness, for example by reading facial expressions in a process of social reciprocity (Hart, 2008; 2011a; 2011b; 2012; 2014).

On the prefrontal level, emotional competency refers to the ability to control primitive behaviours and basic emotions by inhibiting impulses (for example the delay of gratification), to achieve a sense of continuity between past, present and future and to experience shame, embarrassment, remorse and regret. Another result of the development of the prefrontal cortex is the ability to reflect on the emotions and actions of self and others, to make strategies and to maintain internal mental images, the latter being closely related to the development of narrative process (Fonagy et al., 2007; Hart, 2008).

These three levels refer to the three levels that make up and frame the EDS.

### 1.8.3 DEFINITION OF INTERSUBJECTIVITY

Several developmental psychologists have described how infants who are only a few days old are able to co-regulate with their caregiver (Meltzoff, 2007; Moll & Meltzoff, 2011a; 2011b; Stern, 2000; Trevarthen, 2001; 2005). This is an innate ability as well as a way of relating between caregiver and infant, which begins before the infant is able to perceive the caregiver as a subjective person (Trevarthen, 1998). External interactions through intersubjectivity shape the infant's nervous system and gradually lead to the development of internal representations of the relationship. The infant forms attachment patterns and internal representations of others by imitating and attuning with them. Once the child has formed internal representations of generalized interactions, the attachment pattern develops that the child will draw on in future interactions with other people (Stern, 2000).

Trevarthen (1998) distinguishes between primary and secondary intersubjectivity. Primary intersubjectivity develops at the age of 2–3 months when the infant has

developed a sense of the caregiver's attention and about his or her effect on the caregiver, where the child incorporates part of the caregiver through acts of imitation; this bolsters the child's sense that the caregiver is "like me," and "I am like her." The basis of primary intersubjectivity is innate and facilitates emotional communication. The perceived closeness in the interaction with the caregiver leads to basic sensations and affects, which in turn form the basis of more complex emotions. In the primary intersubjective process, the caregiver attunes with the infant's emotions while attempting to match the emotion that the child expresses. Secondary intersubjectivity does not develop until the child is able to attune emotionally with the caregiver's feelings as well as her actions and develops at the age of 7–9 months; its characteristics are that the caregiver and child have joint attention on something outside themselves, and that each is aware of the other's attention. Secondary intersubjectivity develops once the child is able to share experiences and achieve psychological closeness in the same way as he achieves physical closeness. Intersubjectivity is thus the ability to share the subjective states of others and resonate with their perspective (Decety & Meyer, 2008). The MIM-P refers to this construct.

### 1.8.4 DEFINITION OF INTERNAL REPRESENTATIONS

Bowlby (1969; 1973) developed the concept of internal working models, which is now often referred to as internal representations. Bowlby assumed that infants establish internal representations of their world and attachment figures while simultaneously developing complementary internal representations of their own self, based partially on their perceptions about how valued or devalued, competent or incompetent they are in the eyes of the attachment figure. The earliest attachment experiences are acquired through imprinting, but as the brain matures the child gradually becomes able to preserve images of internal representations (Hart, 2011a; Schore, 2016).

Internal representations are constructed through the self-experience of being with others, initially with the caregiver. The presence of internal representations means that children are able to form expectations, adjust their interactions and control future interactions. By paying attention to their own state, infants are able to recognize themselves in interactions with caregivers, which is the condition for entering into and continuously reshaping new relationships. When an infant imitates the caregiver and acts and feels like her in the given moment, the infant will begin to form a representation of how he or she feels inside while being with the caregiver in that particular way. Internal representations are formed on the basis of perceiving oneself as involved in human interactions, and they consist of memories of interactions with others. They are made possible by the cross-modal ability to integrate and coordinate sensations, perceptions, affects and so on. Internal representations are nonverbal and deal with acting and being, and they serve as templates for being with another person. Key to the internal representations is the affective state that characterizes the representations and gives them value (Fonagy et al., 2002; Hart, 2011a; Schore, 2016; Stern, 2000). The EDS is based on the way in which intersubjectivity shapes internal

representations as an important part of emotional development and thus forms the child and parent's understanding of the external world.

### 1.8.4 DEFINITION OF MENTALIZATION

The concept of mentalizing capacity is derived from the theory of psychological mindedness and social cognition. Psychological mindedness dates back to Murray's (1938) concept of "intraception", and before that to Jung's (1922) concept of "introversion" and William James' (1907) concept of "tendermindedness" (Farber, 1985). Psychological mindedness is understood as a disposition comprised of an intellectual and emotional component. The former aspect pertains to a cognitive understanding of psychological issues, while the latter refers to the individual's capacity to experience his/her inner life and to the ability to attune with and share another's feelings (Levinson, Sharaf, and Gilbert, 1966). Psychological mindedness involves the two-part process of understanding oneself and others and the ability to tolerate painful feelings (Kennedy, 1979).

Social cognition is understood as a psychological understanding of the meaning and motivation of one's own and others' behaviour. The concept of social cognition has its roots in Mead's (1934) theory, in which the ability to take another person's perspective is considered to be a fundamental aspect of socialization, and in Piaget's (1965) theory of cognitive development, which views social perspective-taking as arising from the ability to decentre, that is, to consider multiple perspectives in a given situation (Menna & Cohen, 1997).

Selman (1980) later found that perspective-taking has stage-like properties reflecting increasing differentiation and integration of self and others and that it continues to develop into adolescence and adulthood. During adolescence, individuals further develop their ability to perceive others' points of view and to analyse their own and others' behaviours and emotions (Selman, 1980; Selman et al., 1986). These skills provide a basis for an individual's capacity for self-observation. Selman's research showed that children's reasoning develops from an uncoordinated, individualistic understanding to an understanding that coordinates two perspectives and then to an understanding that individual perspectives must be viewed in relation to a complex social system (Selman, 1980).

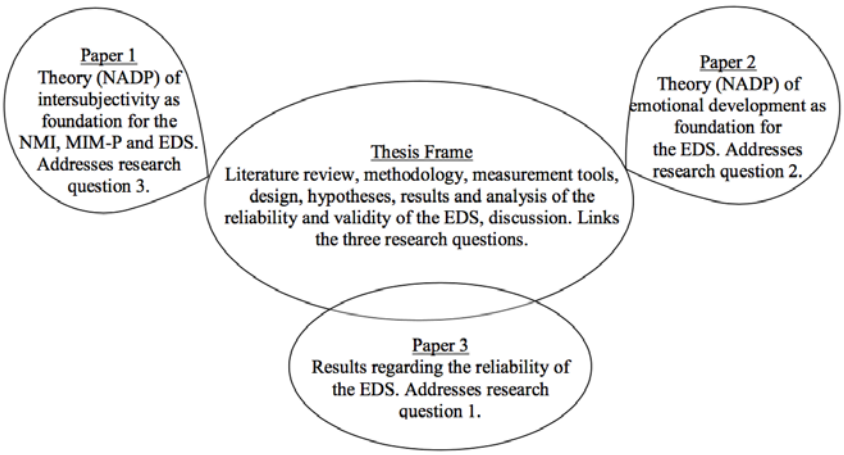
The word "mentalization" was first used by the French psychoanalyst Pierre Luquet (1981). He used the term "primary mentalization" about the infant's sensory and emotional experience of the world and "secondary mentalization" about the later developed symbolizing and linguistic perceptions (Bentzen & Hart, 2018). In the 1990s and 2000s, Peter Fonagy and colleagues linked mentalization to attachment theory (1996, 2001, 2002) and to "our ability to attend to mental states in ourselves and in others as we attempt to understand our actions and those of others on the basis of intentional mental states" (Bateman & Fonagy, 2012, p. xv). The latter theory focuses on the importance of early attachment relationships for the development of our capacity to mentalize, which is viewed as a developmental achievement closely

connected to the development of both affect representation and affect regulation (Fonagy, Bateman & Luyten, 2012). The theory itself has developed substantially over the years and currently covers and draws on an extensive body of work (Katznelson, 2016). The EDS and NMI both refer to this construct.

## 1.9 OVERVIEW OF THE DISSERTATION

The dissertation consists of two parts: 1) an overall summary, (the thesis kappa or frame) and 2) three journal articles, consisting of two theoretical/clinical articles and one article on the empirical study and partial results (see Appendices A, B and P). The three manuscripts for the journal articles have been submitted for publication in peer-reviewed journals over the course of the two-and-a-half-year study. At the time of submitting this dissertation one article has been published, while the two others are still in review.

Figure 1: Structure of the Dissertation




Paper 1 describes the connection between emotional development, intersubjectivity and the development of emotional capacity/vulnerability, which relates to research question III, as it is necessary to understand how the emotional structures of the brain are stimulated through relationships to understand why the three measurement tools (EDS, MIM, NMI) are employed in the validity study. Paper 2 describes the basis of the emotional development and progression of mental organization, which relates to research question 2, as it is necessary to understand what is meant by emotional progression to understand the correlation between the autonomic, limbic and prefrontal levels. Paper 1 and Paper 2 both deal with clinical applicability and relate to the discussion of the results in the thesis frame and in Paper 3. Paper 3 describes the reliability of the EDS-P and EDS-A and is closely related to the results and discussion in the thesis frame.

The thesis frame includes Chapter 1, which is an introduction offering a brief description of the theoretical foundation, conceptual definitions of key constructs and a presentation of the research design and research questions. Chapter 2 includes a summary of the two theoretical/clinical articles, theoretical considerations and a short review of contemporary research on attachment and mentalization, followed by methodological perspectives on measurement tools and the assessor's agency. This is followed by Chapter 3, which is a literature review of measurement tools related to children's emotional development. This chapter presents the screening process, analysis, synthesis and a discussion of results. Chapter 4 is a description of the EDS, its history and measures, constructs, set-up and protocols. Chapter 5 describes the method and the epistemological rationale behind the empirical study, a description of the research design and the practical execution of the empirical study, the measures, the statistical analysis and statistical hypotheses that is deduced from the research questions formulated in 1.5. Chapter 6 presents the results of the empirical study, while Chapter 7 discusses the main findings and relate the discussion to the statistical hypotheses, summarizes the third article, which presents and discusses the results of the empirical study, outlines limitations and offers suggestions for future research.

# CHAPTER 2: THEORETICAL AND METHODOLOGICAL PERSPECTIVES

## 2.1 NEUROAFFECTIVE DEVELOPMENTAL PSYCHOLOGY

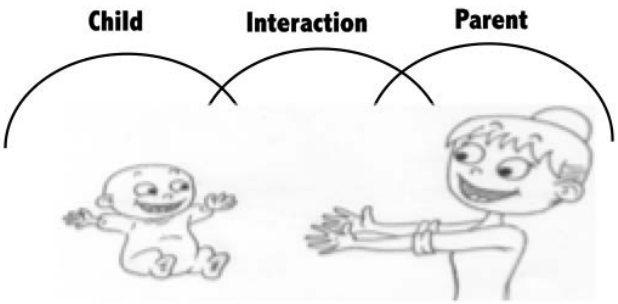
Chapter 2 presents the NADP, as the EDS is based on NADP theory. The theory is further unfolded and applied in the case studies presented in the two submitted articles, which are briefly summarized in the chapter. The chapter also presents relevant research studies regarding attachment and mentalization and methodological perspectives regarding test theory and the agency of assessors.

One of the main challenges in conducting clinical assessments of children within the theoretical framework of NADP is that it includes not only the child, but also the child's relational environment. Children are constantly developing, and their mental function is so closely linked to their relational environment that attachment figures who know the child well must be involved as informants (Schwartz, 2011). The difficulty in this type of assessments lies in capturing individual patterns of adaptation resources and difficulties and their cause and development, irrespective of the child´s behaviour. Thus, from an epigenetic perspective, it is important to map out how mental resources and vulnerabilities are expressed in the child's behaviour and mental understanding. It also involves discerning patterns in the child's relational environment that either contribute to or result in a stagnation of emotional capacities (Rutter & Sroufe, 2000). This correlation between innate capacity, intersubjectivity and emotional development is a fundamental consideration in developing new assessment tools to be used in tailoring intervention plans for children's emotional development and families' well-being.

## 2.2 THEORETICAL PERSPECTIVES

All attachment-based theories suggest that a prerequisite for understanding emotional development and developmental disorders is information about the child and his or her relational environment, as illustrated in the following model (Schwartz & Hart, 2013; Hart, 2016):

Figure 2: Parent-Child Interaction




*(from Hart, 2016)*

The following sections describe theoretical aspects of NADP, which underpin the development of the EDS, MIM-P and NMI. In Chapter 7, the theoretical aspects will be used in relation to the discussion of the results of the empirical study. As mentioned earlier, NADP is an integration of attachment and developmental psychology and trauma theory.

### 2.2.1 PAPER 1:

**The Neuroaffective Triangle and Organizing Intervention in Family Therapy and Psychotherapy – A New Conceptual Framework for Family Therapy**

This article outlines the use of NADP as a helpful theoretical framework in the complex world of family therapy and psychotherapy and outlines how it can be used to create effective intervention plans to fit the needs of each individual family system, parent or child. NADP is helpful for understanding emotional development, personality vulnerabilities and disorders and the maturation of emotional capacities within attachment-based relationships and for translating this understanding into intervention plans that can be adjusted to the complexity of human development and to the skills and agency of the mental health professionals working with the families. The submitted article demonstrates how NADP can be applied in real-life settings; it does so through a family case, where the principles for assessment and intervention are reviewed and discussed (see Appendix A).

### 2.2.2 FROM INTERSUBJECTIVITY TO SELF-REGULATING AND SELF-ORGANIZING CAPACITY

The following sections describe how the child's innate temperament interacts with the environment, and how neural structures are stimulated through synchronized attunements with the caregiver. This intersubjectivity is part of a self-organizing

process that supports the child's emotional and personality development. The self-organization process supports the formation of the child's internal representations of the world and later mentalizing capacity. This happens through stimulation in the child's zone of proximal development within the caregiver-child dyad. Because the caregiver role in this process is so important, the caregiver's attachment and mentalizing capacity are crucial. This understanding underpins the development of the three currently developed measuring tools, the EDS, NMI and MIM-P.

Children are born into the world with different temperaments and thus meet the world differently, but they are all born with a biological readiness to participate in social interactions and have the capacity to initiate, maintain and terminate social interactions with others (Stern, 2000). Through synchronization processes with their primary caregivers, children integrate the culture they are born into through the primary caregivers' internal representation of the child (Hart, 2011). The caregivers' capacity for mentalizing the child is immensely important for the co-regulation and attunement processes. The synchronization and attunement processes are internalized in the child's gradually developing capacity to self-regulate with others (Stern, 2000; Trevarthen, 2001). The competency to self-regulate is measured through the EDS.

Through internalization, the child's affective response system is shaped in accordance with the caregiver's emotional availability and the infant's related coping experiences. Parents and infants mix their behaviour in attuned temporal interactions framed by reciprocal social interactions (Bakermans-Kranenburg & Van Ijzendoorn, 2007; Gunderson & Lyons-Ruth, 2008; Trevarthen, 2005). Although the human brain is self-organizing, the organization process for personal integrity depends on two brain systems, as the child's immature nervous system has a limited capacity for self-organization. The relationship between the two systems promotes the development of a unique pattern of neural circuits in the child's brain that promotes emotions and empathy (Cozolino, 2014; Schore, 2016; Siegel, 2014). That is why the three measurement tools the EDS, NMI and MIM-P are considered to be interlinked.

Psychobiological regulation begins immediately after birth, an infant who is only a few days old is able to co-regulate with his or her caregiver (Meltzoff, 2007; Trevarthen, 2005). Later in life, when the child goes on to preschool and school, other formative relationships develop in interactions with teachers, peers and others. Others' perceptions of the child and of the child's caregivers and extended family influence the child's self-concept and coping strategies (Hart, 2011). Thus, positive attunement and synchronized responses with a significant other promote resilience and emotional growth (Trevarthen & Panksepp, 2016). In using the EDS it is important to consider the impact of later important relationships or life experiences on the child's emotional development and the support or setbacks the child may experience in developing a self-regulating capacity outside the parent-child relationship.

When otherwise loving and dedicated primary caregivers fail to protect the child in an appropriate way, lack adequate understand of the child's needs and have difficulties mentalizing the child, there is a real risk that the child will be vulnerable and struggle to develop emotional skills, regress easily or tend to dissociate, all of which are self-protective responses to overwhelming events that the mental system is unable to assimilate (Hart, 2011). These aspects will be considered relevant in the development of the EDS, as the scale aims to detect regression and dissociative tendencies as well as emotional development.

Because the brain is a self-organizing system that is stimulated by experiences in an interactive development process, every human brain is unique. The child's responses to external stimuli activate specific neurons, which in turn form new circuits and neural patterns (Cicchetti, 2015; Schore, 2016). The subsequent activation of this pattern will initiate an ongoing transformation process that alters and reinforces the original pattern. Once a neural circuit has been established, it is easily reactivated (Beebe & Lachmann, 2002; Stern, 2000). In one of the two EDS scales, the EDS-P, the child's self-organizing system is challenged through dyad activities.

### 2.2.3 CONTEMPORARY RESEARCH STUDIES ON THE COMPLEXITY OF INTERSUBJECTIVITY

To get closer to the complexity and importance of intersubjectivity, Stenstrup (2013) and Katznelson (2015), in their dissertations, conducted a literature review of research studies that looked at the effect of the mother's own attachment pattern on the child. This concerns the link between childhood attachment, internal representations of caregiving, later child and adolescent psychopathology and the development of mentalization. Their most important findings include Fonagy and his colleagues' report from a prospective longitudinal study, the London Parent-Child Project (Fonagy, Steele, & Steele, 1991; 1993). Both Stenstrup (2013) and Katznelson (2015) describe this empirical study, which laid the groundwork for the concept of parental reflective functioning, which in turn later led to the development of a scale to measure Reflective Functioning (RF) through the Adult Attachment Interview (AAI). The results from the London Parent-Child Project showed that if the parents had a high RF rating, they were also likely to be classified as secure in the AAI and to have securely attached children, as measured in the Strange Situation test (Fonagy et al., 1991; 1995). If the parents were rated low on the RF-scale, they were likely to be classified as insecure in the AAI, and their children were highly likely also to be classified as insecure. Further, the results also showed that RF ratings were highly correlated with coherence ratings in the AAI.

Stenstrup (2013) also reported a study by Miljkovitch et al. (2004), which included 31 upper-middle-class French-speaking families from Switzerland. The AAI was conducted with both mothers and fathers. The study showed concordance between secure mothers and higher security scores for their three-year-old children than the

children of insecure mothers. The secure mothers depicted a wide range of affective states in their children and guided them relevantly. Zhou et.al. (2002) examined 180 elementary-school children and found a correlation between parental warmth and positive expressivity and the child's empathic responding and social competence. Data was collected when the children were in second to fifth grades and again two years later. The study supported the hypothesis that parents' (mostly mothers') positive expressivity mediated the relation between parental warmth and children's empathy and social functioning.

### 2.2.4 SYNCHRONIZATION AS THE FOUNDATION FOR SELF-REGULATION AND SELF-ORGANIZATION

All higher personality features, including attachment, self-regulation, impulse control and mentalization, develop through countless micro-regulating and synchronizing interactions, which are subsequently internalized and become part of the child's internal representations. (Hart 2011). This in turn makes the nervous system more resilient and flexible in its ability to deal with daily frustrations and promotes the development of coping and self-regulation skills (Sameroff, 2009; Schore, 2016). By responding to the infant's fluctuating states of primitive signals, the caregiver imbues the signals with meaning and makes them part of an organized behavioural system. As the child grows older and more mature, he or she requires progressively less adult control. The child's developmental achievements become more complex with age, as the environment around the child expands (Sroufe, 2005).

In the 1950s, Louis Sander (Amadei & Bianchi, 2008) introduced the concept of micro-regulation. He explained that the feeling of being connected is established through mutual, precisely timed and synchronized regulation, which plays a key role in brain organization and regulatory processes in the central nervous system (Bartels & Zeki, 2004; Porges, 2011). Tiny moments of synchronization stimulate the nervous system to reorganize and develop, are identity-forming and contribute to neural coherence and the development of self-regulating strategies and self-organization (Schore, 2016; Stern, 2000; 2004; Hart, 2008; 2011). The synchronization process is assessed through the measurement tool the MIM-P.

Over time, the child assigns intentions and motivations to others and develops a sense of how he or she is attuned with others' emotional states. Not only does the child begin to have a rich internal life with feelings, motivations and intentions, he or she also begins to understand that others too have an internal life. Internal experiences can be shared with others, and the child learns to share attention, intentions and affective states (Fonagy et al., 2002; Stern 2000). The core of empathy is the capacity to match the other's affect and provide a resonant response; that is the foundation of mentalization (Decety, 2005; Decety & Meyers, 2008). Hence, the parental mentalization capacity is measured through the NMI, and the child's mentalization capacity is measured through the EDS-P, which is one of the two scales that make up the EDS.

Over time, children become increasingly active participants in their own development (Hart, 2011). The caregiver-child relationship impacts how the child engages with the environment and interprets experiences (Fonagy, Gergely, Jurist & Target, 2002). Any new level of relational organization changes the child's self-organization, and with each new level of self-organization, there is a change in the relational organization, which in turn affects the child's personality development. Initially, the regulation is dyadic and is largely dependent on the caregiver's ability to respond to the child's signals (Meltzoff, 2013; Schore, 2016 Stern, 2000; Trevarthen, 2005). According to NADP, as the child begins to play a more active role in their mutual regulatory processes, increasingly recognizing the other as part of this regulation, the child will be able to see him/herself as competent to induce regulatory support from the other and eventually even to regulate his or her own internal states (Hart, 2011). The caregiver-child relationship promotes the development of the brain's self-regulating mechanisms, and the child's interactions with others gradually strengthen his or her own self-regulation capacity (Cicchetti, 2015; Schore, 2016).

The child constructs internal images of him/herself and others in the everyday interactions that begin at birth; these internal images are the early building blocks of internal representations. Typically, parents attribute positive qualities to their child, and an absence of positive attributions is a serious prognostic indicator (Stern, 1995). The focus of research question III in the dissertation is on finding correlations between the parent's mentalizing capacity, caregiver-child intersubjectivity and the child's emotional development, capacities and vulnerabilities.

### 2.2.5 SELF-ORGANIZATION THROUGH THE FORMATION OF INTERNAL REPRESENTATIONS

As the infant, and later the child, forms these internal representations of attachment experiences and other life experiences, he or she builds an internal base, which may be secure or insecure, and which helps to organize the child's behaviour, including in social relationships later in life. Once an internal representation has become sufficiently comprehensive, it brings the story of that relationship into every new interactive experience and influences the course of every new interaction (Hart, 2011; Stern, 1995). When a new interactive event has been internalized, this new experience may alter the pre-existing internal representation. This gives rise to a dynamic interaction between past and present, between established internal representations and present exchanges, between the relationship and the ongoing interaction. The relational process and the changes in internal representations never end, not even in adulthood (Karr-Morse & Wiley, 1997). The ability to judge external stress and to access personal and social resources depends on the quality of the internal representations (Sroufe, Egeland, Carlson & Collins, 2005), which forms the child's self-organization processes, that is, capacities and vulnerabilities that are measured challenged on the EDS-P and the EDS-A, the two scales that make up the EDS.

### 2.2.6 PAPER 2:

**Zones of Proximal Emotional Development – Psychotherapy Within a Neuroaffective Perspective**

NADP is based on the hypothesis that emotional development requires different kinds of stimulation on the different levels of mental organization that emerge throughout the developmental process. The autonomic mental organization level needs synchronized human interactions to develop; the limbic mental organizing level requires affective attunement to develop; and the prefrontal mental organizing level develops through dialogical communication (Hart, 2008; 2011).

Paper 2 outlines how the conceptual framework of NADP can be used to assess personality and emotional functions within the zone of proximal emotional development. The article highlights qualitative aspects of an assessment and the importance of including qualitative and quantitative methods in assessing a child and his or her relational environment. As the dissertation focuses exclusively on quantitative research design, this article highlights the necessity of utilizing both qualitative and quantitative assessment methods together with a consistent theoretical frame to grasp the complexity of a child's mental functions. Within the theoretical framework of NADP the article describes children's normal emotional mental organization and examines how its development may be hampered or promoted by relational interactions. The description is based on three case vignettes about three children who grow into adolescence with three different attachment patterns, combined with proposals for individual intervention plans. The published article describes how NADP can be used to structure an intervention plan based on a case analysis. Because the EDS is under development, it is not included in the case analysis (see Appendix B).

### 2.2.7 GENDER DIFFERENCES

Although gender variance is less than the variance across the general population the empirical study includes a correlation study of gender differences, because the topic of gender differences and similarities is an important social issue (Hart, 2008). In NADP gender differences are understood as having developed along with the brain structures. Humans are born with a set of gender-specific, biopsychological conditions that have to be fitted into human culture. Gender characteristics play out in a close interaction between heredity and environment, and for gender characteristics, as for many other human properties, a person's innate gender-specific potential is shaped in interactions with culture (Hart 2008; Michael & Zumpe,1998).

There are indications that early childhood conditions may have a modulating effect on gender differences in brain structures (Cameron, 2001), but we are still far from a full understanding of gender differences, and many research findings are mutually

contradictory (Brannon 2016; Grijalva et al., 2015; Hart, 2008). The gender-specific organization of the brain is influenced by the infant's environment after birth, as the activity of sex hormones interacts with the infant's environment, and the genome encounters the environment through interactive experiences that set off hormone secretion. Neural gender differences depend on the early childhood environment, and affective stimulation permanently shapes the psychological sex (Hart, 2008; Ruigrok, 2014; Schore, 2016).

The genetic differences between males and females are minimal, but the psychological effects of these tiny differences are multiplied throughout our personal development. Children with an innate disposition towards being active and extrovert encounter a different response than children who are calm and passive. Girls and boys often evoke different types of response from their caregivers and in other primary relationships when they display conventionally girlish or boyish behaviour. The different reactions further differentiate the original behaviour. Even though innate differences are minimal, they soon become self-increasing (Solms & Turnbull, 2002). Studies by Lutchmaya and Baron-Cohen found that girls as young as one to two years have more gaze contact with their mothers than boys do, and at the age of four years, girls do considerably better in a "theory of mind" test than same-age boys (Baron-Cohen, 2003; Lutchmaya & Baron-Cohen, 2002; Lutchmaya, Baron-Cohen & Raggatt, 2002).

Boys and girls who are exposed to traumatic experiences or neglect have different reactions, in part due to the impact of sex hormones. Thus, boys are more likely to develop hyperarousal disorders in the form of impulsive, aggressive behaviour and attention and conduct disorders (ADHD), while girls are more like to react with hypoarousal disorders in the form of anxiety, panic attacks and dysphoria. Boys or men are more likely to react with a sympathetic fight-or-flight pattern, while girls or women are more prone to a parasympathetic freeze response (David & Lyons-Ruth, 2005; Nickels, Kubicki & Maestripieri, 2017). Because the neuroanatomical differences between women and men's brains are so small, and because the average variance is so big, we still have a long way to go before we have enough information to offer a convincing definition of neuroanatomical gender differences.

## 2.3 METHODOLOGICAL PERSPECTIVES

As this dissertation concerns construction of a measurement tool, the next passage presents considerations regarding test construction, psychological assessment methods and psychological tests. It is an oft-neglected fact that the observer or rater of an assessment or a test method is not an objective observer; thus, his or her internal representations will influence the results, especially when the rater compiles the results simultaneously while interacting with the child in the performance test (Hayes, Gelso, Hummel & Managing, 2011). Thoughts on how the rater's internal representations affects the results is discussed and further elaborated in Chapter 7.

### 2.3.1 METHODS FOR CONSTRUCTING PSYCHOLOGICAL MEASUREMENT TOOLS

According to the *Standards for Educational and Psychological Testing* (2014), measurement tools should refer to validity, this is, the degree to which evidence and theory support the interpretations of test scores. Because no scoring process is objective, an individual's obtained score and the average score of a group will always reflect at least a small amount of measurement error. Hence, a study of a test's reliability provides information about measurement errors which is crucial for the evaluation and use of a measurement tool (Hanna & Demster 2012; Robson & McCartan, 2016).

The development of the EDS, NMI and MIM-P is an attempt to produce assessment tools that measure different aspects of the child and parent's emotional and mentalizing skills and abilities to attune with each other. This includes specifying conditions for test administration and determining procedures for scoring the test performance and reporting the scores. The *Standards for Educational and Psychological Testing* (2014) specify that when information is obtained from empirical data, the sample must be sufficiently large and representative of the population for which the test is intended; scale scores should indicate how a given score compares to those of other test takers (reliability); and the scores must correlate with scores obtained using different forms of tests (validity). The present empirical study has been guided by these requirements.

There are two basic approaches to the construction of psychological tests, the exploratory (for example the inductive) and the confirmatory (for example the deductive) approach (Poulsen & Simonsen, 2017). As the empirical study presented in this dissertation is based on an established theoretical understanding of the construct, the study is based on a confirmatory approach. The theoretical knowledge of emotional development supports the development of a test that can contain the level of emotional complexity and the developmental issues that are needed to get a broad understanding of a child's emotional development, resources and vulnerabilities.

There is a whole range of tests that assess individual aspects of emotionality, but nothing that treats emotionality as a coherent entity (see literature review in Chapter 3). Hence, it seems relevant to develop a test that embraces a range of emotional aspects sorted and scored according to the theoretical hierarchy of human mental organization. The purpose is to make it possible to place emotional functions and dysfunctions into a developmental context and to correlate this information with intersubjective functions between parent and child and the parent's mentalizing capacity. Good psychological tests are reliable, valid and have good norms, so that the test actually measures what it claims to measure, and reliability is prerequisite of validity (Guilford, 1956; Kline, 1986; Nunnally, 1978). The use of valid and reliable instruments with well-described psychometric properties provides a far more accurate

assessment of resources and vulnerabilities and thus enables more uniform assessments (Poulsen & Simonsen, 2017).

### 2.3.2 PROJECTIVE TESTING AND QUESTIONNAIRES

Before the development of questionnaires, many methods of personality evaluation consisted of projective testing (for example Rorschach and CAT/TAT) derived from psychoanalysis. Projective tests were developed from the 1920s until the turn of the millennium within a psychoanalytical framework, but the popularity of projective testing has declined in recent decades, probably due to validity and reliability issues (Lilienfeld, Wood & Garb, 2000).

Since the 1950s, there have been widespread efforts to develop personality tests based on self-reporting and questionnaires in adult psychology (Poulsen & Simonsen, 2017), and in recent decades, these tests have also been developed for children. For children, these tests include assessments based on questionnaires completed by caregivers/teachers. There are inherent limitations in using questionnaires as the sole approach to assessing children's behaviour. Parental reports may be influenced by the parent's level of education, social class and personality characteristics or psychopathology and so on, and the use of multiple informants can be advisable, as is the intention in the EDS-A (Colegrove & Havighurst, 2016; Möricke, Buitelaar & Rommelse, 2016). Additionally, parents The construction of the EDS consists of both a performance test (EDS-P) and a structured assessment (EDS-A) of the child based on a structured interview with informants who know the child well that is scored and rated by the psychologists conducting the interview. In the EDS-P the psychologist plays an active role in obtaining the information to be scored, evaluates the child based on observations of the child's behaviour in interactions, and rates his or her competencies and vulnerabilities with the aid of a numerical scale.

## 2.4 THE ASSESSOR'S AGENCY IN ASSESSING

Clinical practice often involves a combination of clinical interviews, observations and tests, and in both qualitative and quantitative approaches, it is important to bear in mind that the rating psychologist is not an objective observer but learns about the test persons through the interaction that takes place during the assessment and/or test period (ibid.). The psychologist thus draws on his or her experiences, professional understanding and humanity in the meeting with the test subject. Hence, it is important that the psychologist in charge of the test or assessment is aware of his or her own blind spots in the interaction and as a rater (Hart, 2011).

The observer's subjective perspective must never be ignored but should be combined with both a theoretical understanding of the phenomenon that is addressed and test methods that help structure the description of the phenomenon (see Paper 1). This

aspect is addressed in quantitative studies through measurements of interrater reliability (Roberts. Priest & Traynor, 2006). Unfortunately, very little research has been conducted regarding what could be called “the assessors agency in assessing”, known as “countertransference” in the psychoanalytic literature. Countertransference is defined as the set of emotional responses elicited in the therapist by specific qualities in the patient (Gabbard, 2001). Sigmund Freud first discussed the construct in 1910 and described it as the result of the patient's influence on the therapist’s unconscious conflicts (Kernberg, 1965; Winnicott, 1960). It is relevant to address how countertransference influences the results of psychological measurement tools and how interrater reliability and countertransference influence each other (Hayes, Gelso, Hummel & Managing, 2011; Wolstein, 1988).

Expert opinions on emotional development, mentalizing capacity and intersubjectivity must be based on personal mentalizing capacity, knowledge, training and experience (Budd, Poindexter, Felix, & Naik-Polan, 2001). The observer and rater’s mentalizing capacity is thus essential for the reliability of a measurement tool. Further, it is essential to train the professional in the proper use of the instrument until the required degree of conformity with an expert assessment is reached, as expressed through an interrater reliability coefficient (Poulsen & Simonsen, 2017). Although it is impossible to eliminate subjectivity in scorings completely and to obtain measures that are unaffected by errors of human judgement, this issue is addressed in quantitative studies through measurements of interrater reliability. In the present empirical study, countertransference aspects are addressed by highlighting the importance of the raters’ training and of interrater reliability studies. These topics are further discussed in Chapter 7.

## 2.5 SUMMARY

The main focus of this empirical study is the psychometric properties of the EDS. The aspects covered by the EDS is emotional development, competencies and vulnerabilities, which are measured through direct behaviour, communication skills and reflections and through an assessment of emotional skills based on information from key informants in accordance with the theoretical framework of NADP.

One of the major challenges in conducting clinical assessments of children within an attachment-based theoretical framework is that it implies that not only the child, but also the child’s relational environment must be included in the assessment. It is important to map out how mental resources and vulnerabilities are expressed in the child's behaviour and mental understanding. Emotional development is based on epigenetic capacity and matures through intersubjectivity in the attunement processes with important caregivers. This understanding is fundamental for generating new measurement tools in order to tailor intervention plans for challenged children’s emotional development.

# CHAPTER 3: LITERATURE REVIEW

## 3.1 LITERATURE REVIEW OF MEASUREMENT TOOLS

Chapter 3 presents a literature review of measurement tools that have already been developed regarding children's emotional development, competencies and vulnerabilities. This is done to ensure that EDS contributes something new to the field and that the current study does not merely replicate previous research findings. The chapter begins with a description of the search method and article databases used in the literature review, which focused on measurement tools aimed at 4–12-year-old children's emotional development, competencies and vulnerabilities. This is followed by an analysis, synthesis and discussion of the results, and relevant findings are identified. Finally, considerations are offered concerning the limitations of the literature search.

The design of the literature review was inspired by the model used by Cochrane and Campbell (Rieper, 2013), in the sense that each section first describes inclusion and exclusion criteria together with keywords and Boolean connectors. This is followed by a flowchart of the screening process, the results, an analysis and synthesis of the results, a discussion and a comparative meta-analysis of measurement tools that are close to the EDS with regard to style and theoretical foundation. The chapter closes with a methodological critique, that is, a summary of the limitations of the literature review and a summery.

## 3.2 LITERATURE SEARCH METHOD

With guidance from the library at Aalborg University, the researcher employed a block search, reference search (snowball), free-word and keyword search through the search engines Primo and Google Scholar. In addition, she conducted a search of established psychological test publishers' catalogues and took advantage of her extensive knowledge as a clinical psychologist in carrying out a hand search of psychological assessment methods and tests used in clinical settings. She used a Thesaurus dictionary to help define relevant keywords and drew search terms and keywords from the theoretical and empirical literature as well as keyword combinations with Boolean connectors:

The researcher used the "5 Ws" to structure her literature search:

WHAT: keywords that define the desired knowledge, subject and aim.
WHERE: choice of database, browser, etc.
WORDS: finding keywords, for example through dictionary of synonyms and antonyms (Thesaurus).
WORK: constructing the search with the use of Boolean connectors

WOW: evaluating the outcome and possibly repeating the process.

The following databases were applied: Cambridge Journals Online, ERIC, JStor, Oxfordjournals, ProQuest, ProQuest Research Library, PsycArticles: PsycCritiques, PsycInfo, PsycTests, PsycTherapy, Scopus, Web of Science and PubMed.

Only English-language assessment methods were included in the literature review. The assessment methods found were published between 1921 and 2016.

## 3.3 THE LITERATURE REVIEW

In the following passage the process of the literature search is presented.

### 3.3.1 INCLUSION AND EXCLUSION CRITERIA

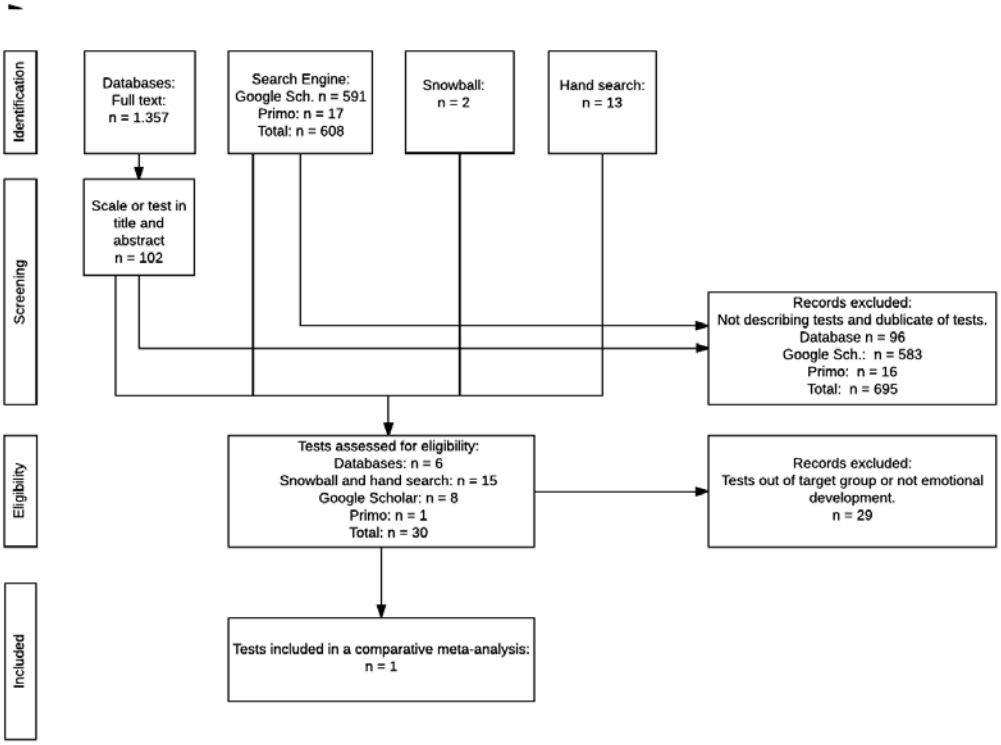
Included are all findings of tests and assessment methods that aim to uncover emotional, social and personality traits in 4–12-year olds. Included are articles where the keywords child*, test* or assessment* featured in the title or abstract. Excluded were psychological assessment methods and tests of infants or youth/adolescents and cognitive assessment methods and tests.

### 3.3.2 KEYWORDS AND BOOLEAN CONNECTORS

Emotion* OR Empath* OR Feeling* OR Sympath* OR Mentali* OR “Emotional intelligence”
OR Social OR Sensory OR neuro* OR Affect* OR Behav*
AND
Development* OR “Development* age” OR Skill* OR Integrati* OR Sequen* OR Performance OR Structure OR Regulati*
AND
Kid* OR Child*
AND
Test* OR Measure* OR Questionnaire* OR Scale OR Psychometric* OR Analysis OR Assessment OR Evaluation OR Profile OR Model OR Observation OR Draw*
NOT
Adult OR Patient

### 3.3.3 FLOWCHART OF THE IDENTIFICATION AND SCREENING PROCESS

Figure 3: Flowchart of Findings of Measurement Tools




## 3.4 ANALYSIS AND SYNTHESIS OF RESULTS

The results of the literature review are found in Appendix C. Beneath is a summary of the findings:

Table 1: Summary of Findings

| | **Number of finds** | **Percentage (%)** |
|---|---|---|
| **Questionnaires/Rating Scale** | n = 18 | 60.00 |
| **Performance** | n = 5 | 16.67 |
| **Projective** | n = 4 | 13.33 |
| **Structured reporting, observation or interview** | n = 2 | 6.67 |
| **Self-judgement** | n = 1 | 3.33 |
| **Total** | n = 30 | 100.00 |

The literature review found a predominance of measurement tools consisting of self/other-reporting via questionnaires completed by children, parents and/or teachers whose answers are transformed into rating scales; this accounts for 18 (60%) of the 30 assessment methods found through the literature review of tests in use since 1989.

Five performance tests were found, one developed in the 1990s, the four others in the present millennium. Presumably due to the difficulties involved in constructing tests of emotional development along the same lines as tests of cognitive and gross- and fine-motor development, it has proven difficult to construct a performance test of emotional development.

Eight performance tests were found that address aspects of emotional capacity, but they were excluded from the present empirical study, since although they assessed certain aspects of emotionality, some on the limbic, others on the prefrontal level, they did not consider the aspects in a construct designed to assess emotional development. They were therefore not considered relevant for the validity study of the EDS. The tests found in the literature review that did address emotional aspects were:

1) Emotional Cognitive Scale (ECS), which assesses prefrontal aspects, measuring the intensity and valency of five different emotions over 15 different scenarios by asking the children how they think they would feel in different situations.

2) Kids' Empathic Development Scale (KEDS), which assesses prefrontal aspects, asking the tested children how they think they would feel in different situations and assesses core affective, cognitive and behavioural components of empathy by coding the child's responses to individual and interpersonal situations differing in social complexity from picture scenarios.

3) FACS Test (Ekman 60 Faces Test), which measures limbic aspects by asking children to identify photographic representations of basic emotions.

4) Reading the Mind in the Eyes Test (RME-child), which measures the child's aptitude on the limbic level for understanding social causality by capturing emotional states based on images of the child's eyes.

5) Social Emotional Evaluation (SEE), which measures social competencies based on audio and visual material on the limbic level.

6) Test of Emotion Comprehension (TEC), which assesses the child's emotional stimuli on the limbic level by asking the child to point to one of four cartoon faces representing different emotions matching the protagonist in a story.

7) Q-sort Scale – emotional regulation, a measurement tool were observers rate behaviour and temperament during home visits based on observations conducted in the child's natural environment, which relates to all three levels in the heuristic model of the triune brain, but not to emotional development.

8) Neurosequential Model of Therapeutics (NMT), a measurement tool that provides an outline of the child's developmental trajectory.

The NMT was the only measurement tool found in the literature review that had some similarities with the EDS. The NMT was considered relevant for the validity study of the EDS, but the training and certification process that would be required was too lengthy and costly to make it possible. A short description of the NMT follows after the discussion of the results in this chapter.

## 3.5 DISCUSSION OF THE RESULTS

The findings from the literature review indicate that personality psychometrics have focused on studying personality dimensions, behaviour and temperament rather than emotional development. Concerning performance tests, no tests were found that included a theoretical approach of mental organizations of emotional development or scales that measure the level of emotional development. Also, no measurement method was found that divides emotional dimensions into mental organizations and looks at emotional development, apart from the NMT. In the literature search, no other measurement tool besides the NMT was found that assesses both limbic and prefrontal aspects of emotionality and also assesses the autonomic level; hence, the NMT is further described in the following passage.

Remarkably, 60% of the measurement tools found in the literature review were based on questionnaires. As described in Chapter 2, there has been a considerable effort to develop personality tests based on self-reporting and questionnaires over the past

many decades, and there are inherent limitations in using questionnaires as the sole approach to assessing children's behaviour, as discussed in 2.2.3. Based on historically poor agreement between direct observer and parent ratings of children's behaviours, Kagan (1998) suggests that the reliability and validity of parent- and teacher-reported questionnaires may be limited. Jacobsen (2012) emphasizes that the parent's representation of his or her own abilities as a parent might differ from what is actually observed by professionals; it should be noted that this is not a reflection of the truthfulness of the parent's answers, as the questionnaires control for this, but rather stems from the difficulty of accurately assessing one's own behaviour. The same argument is relevant regarding the child.

### 3.5.1 THE NMT

The NMT provides an outline of the child's developmental trajectory to his or her present set of strengths and vulnerabilities and highlights developmental age, rather than chronological age, as the best indicator for targeting educational and therapeutic experiences (Perry, 2016). It utilizes structured reporting/interviews with as many informants as possible who are asked specific questions about aspects of the child's emotional capacity. The answers are scored by the clinician on a scale that draws on neurosequential theory (Perry et. al., 2016). The metrics of the NMT are designed to provide a broad overview and structural context for clinical problem-solving on motor, cognitive and emotional aspects (Perry & Hambrick, 2008; Perry, 2006; Perry, 2009; Perry, 2014). It is a developmentally sensitive and neurobiologically informed approach that is developed and has most widely been used with traumatized and maltreated children and youth. The NMT is based on a neurobiological understanding of the brain's structure and on knowledge about the consequences of severe psychological trauma (Perry, 2016).

The NMT metrics consist of a collection of data and background information about the child from multiple sources, including previous health records, school records and input from parents, foster parents, other caregivers, clinicians and any other person who may have information about the child. It takes a brief, approximately 45-minute-long, consultation with a clinical team and the family to complete a web-based NMT Clinical Practice tool (the NMT Metrics). The NMT is a fairly recent approach; however, the collection of data using the web-based NMT metrics allows for a rapid accumulation of data (ibid.). Differences and similarities between the NMT and the EDS are discussed in Chapter 7.

## 3.6 LIMITATIONS OF THE LITERATURE REVIEW

In relation to the search method, the block search through PRIMO and Google Scholar did not prove as effective as expected. This is undoubtedly due to the fact that it is difficult to find keywords on specific measurement tools, as the specific name rarely matches the search terms. Many of the measurement tools found in the hand search

would likely not have been found without the researcher's thorough knowledge of measurement tools in clinical settings. For instance, regarding children's emotional development it takes special knowledge to know that the Neurosequential Model of Therapeutics (NMT) concerns levels of mental developmental. Both the block search model and the keyword search seem most effective for finding relevant research-based articles within a particular subject, but not for finding assessment methods and tests.

Due to the low number of findings from the block search, it seemed appropriate to check different psychological test providers on the commercial market. Also, finding articles and published dissertations though search engines and uncovering relevant results from their literature review did uncover a few results, and thus proved a relevant approach. After identifying the name of a number of tests, it was subsequently possible to search for research articles on the particular test, but generally, the search was unproductive.

The literature review was a laborious process with many obstacles. It is debatable whether the search was ultimately too narrow. Below are some points that might have yielded more relevant material:

- Using fewer keywords in the Boolean search criteria
- Including more "full text" in the databases (not only abstracts)
- Spending more time on chain searches – including journals that are not online
- Identifying and contacting more psychological test publishers
- Contacting other researchers in the field

Within the limitations of this study, it made sense to reduce the search, although a more complete and time-consuming review would undoubtedly have allowed the researcher to be more confident that there are no measurement tools similar to the EDS.

Regarding the validity study of the EDS, the method was validated with two standardized questionnaires, PSI and PCRI, together with the two newly developed measurement tools, the NMI and the MIM-P. The focus of the NMI is to measure the caregiver's mentalizing capacity, and the focus of the MIM-P is to measure the intersubjectivity between caregiver and child. As the NMI and MIM-P were developed recently, a literature review was also conducted regarding these two measurement tools. The literature review, results, discussion and conclusion regarding the MIM-P and the NMI are outside the scope of this dissertation, but as it was carried out in connection with the preparation of the thesis, the researcher is in the process of planning a manuscript for an upcoming article submission.

## 3.7 SUMMARY

As Dileo (2005) points out, a literature review provides reassurance of not executing a research project that is mere a copy of previous research projects or a development of measurement tools that have already been developed. The literature review confirms that it is appropriate to develop a validated and reliable measurement tool for children's emotional development, competencies and vulnerabilities, to be able to tailor intervention plans.

The presence of personality tests for children based on self/other-reporting and questionnaires is impressive. Furthermore, many of the questionnaires base their information on overt behaviour and not a theoretical base. Taking these limitations into consideration, is seems relevant to develop measurement tools resting on theoretical considerations such as NADP including psychometric qualities taking subjectivity and objectivity into consideration. The EDS, with a performance test combined with a structured assessment, might offer helpful in-depth information regarding emotional-age-specific development and emotional competencies and vulnerabilities through both performance observations and structured information gathered from caregivers that know the child well.

# CHAPTER 4: THE EMOTIONAL DEVELOPMENT SCALE (EDS)

## 4.1 THE EMOTIONAL DEVELOPMENT SCALE (EDS)

As the focus in this dissertation is on the investigation of the EDS, this chapter deals with how elements of NADP is transferred into a measurement tool, the EDS. The EDS is developed from an understanding that emotional development occurs in a developmental progression requiring different types of stimulation on the different levels of mental organization in synch with the development of brain structures. This chapter also describes the history of the EDS and its underlying construct, set-up, protocol, scales and psychometric qualities.

### 4.1.1 THE HISTORY OF THE EDS

The development of the EDS began in spring 2012, when a group of certified psychologists were invited to take part in developing the EDS for children aged 4–12 years. Prior to this, the test publisher Hogrefe Ltd. had agreed to take part in developing the test. In the summer of 2014, the project teams reported that the material was ready; the teams were consequently dissolved in January 2015. In the following period, the EDS-P and EDS-A underwent subsequent revisions and modifications. In autumn 2014, ten psychologists conducted the first pre-test of the EDS-P and EDS-A with approximately 30 normally functioning 4–12-year-olds. The EDS-P and EDS-A were further revised based on the ten psychologists' feedback. The process of structuring and refining the EDS took place in late summer 2015, after which time Hogrefe Ltd. prepared test materials, registration forms and so on. The first pilot was carried out with approximately 100 4–12-year-olds in autumn 2015, and the EDS was revised based on the results of this data collection. The next data collection period began in January 2016. The data collection period ended in April 2018 with a sample consisting of 352 participants, and the process of standardization and developing the scoring system is currently in process. The current empirical study includes data from a preliminary ad hoc sample from Hogrefe Ltd. consisting of 213 participants also described in the Introduction.

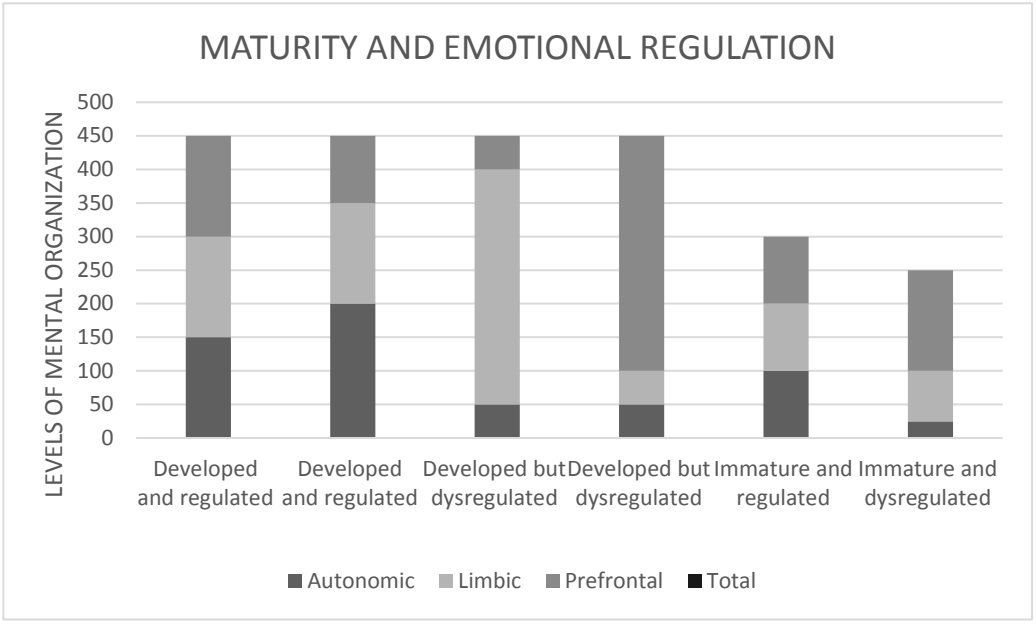
### 4.1.2 DEVELOPMENTAL PROGRESSION ON THREE DISTINCT LEVELS OF MENTAL ORGANIZATION

NAPD intends to predict that healthy development shows a pattern of progression where scores on the autonomic level are moderately higher than scores on the limbic level, and scores on the limbic level are moderately higher than scores on the prefrontal level or that the three levels are equal. Generally, a lower level should have

more resources and, thus, higher scores than a higher level, as that provides a good foundation for further maturation. The scores are expected to increase as the child grows, as a part of the maturation process that happens as a result of emotional stimulation. A total score that reflects this structure but is low on all three levels indicates a high degree of general emotional immaturity. If the total score is high, it generally indicates a high level of emotional maturity. If the total score reflects the above-mentioned structure, and the difference between the three levels is small or equal, there is a good mental balance. A high difference between scores on the three levels indicates an uneven maturation of the three levels. A low total score on a low level indicates a weak foundation for higher levels of maturation. This hypothesis is tested in connection with the determination of the predictive validity in the empirical study and further discussed in Chapter 7.

Below is a bar chart of different possibilities of emotional maturity in total and on the three levels of autonomic, limbic and prefrontal. The level of emotional development overall is shown on the y-axis together with the balance between the three levels: autonomic, limbic and prefrontal. The regulated state is when the three levels balance or when there is a slight progression between the three levels with the highest score on the autonomic, then the limbic and then the prefrontal level. The regulated state can either bee mature or immature depending on the child's biological age.

Figure 4: Bar chart of maturity and emotional regulation



## 4.2 THE EDS MEASURES

The EDS is constructed to assess 4–12-year-olds' emotional development, competencies and vulnerabilities. The EDS consists of the EDS-P, which is a performance test, and the EDS-A, which is a structured assessment consisting of two parts that informs the psychologist about the child's level of emotional functioning concerning aspects that are not measured by the EDS-P. The EDS-A is formed as a structured interview for parents, caregivers or professionals who know the child well.

### 4.2.1 THE TWO EDS CONSTRUCTS

The EDS-P and the EDS-A are developed to support each other. Both the EDS-P and EDS-A are designed to measure children's emotional competencies and vulnerabilities from a developmental perspective. The EDS-P is based on a performance test, and the EDS-A is based on a structured assessment.

The EDS-P consists of a structured setting, where the psychologist asks questions and challenges the child through activities. In the test session, the task sequence follows a clear progression where activities that help build trust are introduced at an early stage in the test session, while more challenging activities come later (Hart, Birck & Hellborn, 2016). In the administration of the EDS-P the psychologist assesses the child's ability to handle the activities and the quality of the answers regarding mentalizing capacity.

The EDS-A involves asking the parent or other informants about the child's competencies and vulnerabilities. The psychologist then scores the parent's (or other informants') answers about the child's emotional functioning in everyday environments outside the clinical setting. Both the performance test and the structured assessment are aimed at assessing functions on the three emotional levels: autonomic, limbic and prefrontal. The purpose of combining a performance test and a structured assessment in the same measurement tool is to collect information about the child's emotional development, competencies and vulnerabilities, both from a safe, stable and supportive setting, and from the child's natural environment. Since it is approximately the same emotional features that are being investigated in different settings, it is relevant to examine the relationship between the two different methods of information collection.

### 4.2.2 SET-UP IN THE EDS-P

The psychologist prepares a safe and undisturbed test environment in a room that is big enough to play the games included in the test. If necessary, the psychologist may help the child maintain focus; also, if the child needs one or more short breaks during the test situation, to do something else with the psychologist, this too is allowed. The psychologist maintains structure and control throughout the session with a friendly,

playful and engaging attitude, without commenting on the child's performance, and encourages the child to continue after being challenged. The length of the session depends on the child's temperament and age, but the tasks are designed to be completed within 60–70 minutes, possibly with a break of 15 minutes. With smaller children, it is sometimes appropriate or necessary to distribute the test over two sessions and reduce the session to approximately 30 minutes (ibid.).

### 4.2.3 THE EDS-P PROTOCOL

The EDS-P consists of 18 activities and 54 items. The 54 items are divided into the three mental organizations: autonomic, limbic and prefrontal. The 18 activities are designed to challenge the child's emotional and social capacities. The EDS-P aims to assess each of the three levels of mental organization, and a total score is found by adding up the three levels (ibid.).

The 54 items are divided into three levels: Autonomic level: 13 items
Limbic level: 12 items
Prefrontal level: 29 items

### 4.2.4 THE EDS-P ITEMS

As mentioned above, the EDS-P consists of 18 activities divided into three mental organizational levels. The activities are developed to assess whether the child is able to perform the activity satisfactorily with the psychologist within the three mental organizations. At the autonomic level, the activities address whether the child is able to imitate, synchronize and handle turn-taking with the psychologist and whether the child can detect body sensations when challenged. At the limbic level, the activities assess the child's ability to attune emotionally with the psychologist, read the psychologist's feelings, feel empathy or sympathy with the psychologist when challenged and balance between taking care of his or her own needs and having consideration for the psychologist's needs when challenged. At the prefrontal level, the activities address the child's ability to inhibit gratifying impulses and perform activities, even when they are boring, when challenged by the psychologists. At this level, the child's mentalizing capacity is also tested by questions from the psychologist.

Table 2: Examples of activities in the EDS-P

| | Item no. | Activity | Purpose |
|---|---|---|---|
| **Autonomic level** | 7 | The psychologist makes funny faces and asks the child to mimic the expression. Afterwards the psychologist asks the child to make funny faces that the psychologist then mimics. | The psychologist assesses whether the child seeks eye contact, synchronizes and has an expressive face during interactions with the psychologist. |
| | 8 | The psychologist tells the child that they are going to make some music together. The psychologist claps a rhythm and asks the child to follow. | The psychologist assesses whether the child seeks eye contact, synchronizes and take initiatives to turn-taking and has an expressive face during interactions with the psychologist. |
| **Limbic level** | 1 | The child is shown photographs of four different faces showing seven different facial expressions: neutral, joy, surprise, fear, sadness, disgust and anger. The child is asked to tell the psychologists which feelings are expressed. | The psychologist assesses whether the child is able to recognize emotional facial expressions. |
| | 3 | The psychologist blows soap bubbles and then pricks them together with the child. The child is asked to burst as many bubbles as possible before they touch the floor or break up on their own. Afterwards the psychologist and child together try to burst the bubbles to see if they can burst more bubbles when they work together. | The psychologist assesses whether the child is able to interact with the psychologist and balance between self- and other considerations. |
| **Prefrontal level** | 12 | The child is shown video-clips of two different persons showing four different emotional expressions twice. One expression is authentic and the other one is an 'as if' expression. The child is asked to identify the difference between the authentic expression and the 'as if' expression. | The psychologist assesses whether the child is able to identify the difference between an authentic and an 'as-if' expression. |
| | 18 | The psychologist asks the child what his/her best friend would say about him/her, what type of person the child is. The child is also asked what he/she thinks his/ her father or mother would say about him/ her. | The psychologist assesses whether the child is able to see him/herself through the eyes of others. |

The psychologist scores the results based on video recording of the session. The rating of the EDS-P is based on the psychologist's assessment of the child during the uptake. When rating the EDS-P the psychologists have to be sure that they do not confuse temper traits, for example mistaking shyness for an inability to attune with others. The scoring depends on the child's ability to regulate temper, mood and emotional issues in resonance with the psychologist. The activities have been developed to reflect the child's self-regulating capacity on the three levels of mental organization along with the child's overall mentalizing capacity. The reliability analysis is conducted to ensure that the ratings reflect the dimensions they are supposed to reflect (Coolican 2014; Hanna & Demster 2012).

### 4.2.5 THE EDS-A PROTOCOL

The EDS-A uptake takes approximately 50–60 minutes. The information is supposed to be retrieved from as many informants as possible to be sure that the information is not skewed or biased by the informant's internal representations and to give the psychologist a more nuanced picture of where the informants either agree or differ in their observations of the child.

The assessment guide consists of two parts. The first part concerns Allan Carr's (1999) case-formulation model regarding predisposing, perpetuating, provocative and protective factors in the child's life story and the age of the child when specific experienced or event(s) occur. That is, circumstances that concern congenital or early difficulties (predisposing factors), what aspects of the child's life have maintained the difficulties (perpetuating factors), which experiences led to the difficulties (provoking factors), and what has helped the child to overcome them (protective factors). This part of the assessment is conducted with parents or caregivers with knowledge about the child's early years.

The second part concerns the child's mental organizations at present. In the initial development of the EDS-A, it was envisioned as a structured interview to investigate the parent's internal representations of the child. This concept later changed, and the EDS-A is now a structured assessment rated by psychologists based on gathering information from as many informants as possible with knowledge of the child, including educators or teachers, to prevent bias, for example stemming from possible distorted internal representations of the child, and to add information about emotional aspects concerning the child that cannot be obtained through the EDS-P. This offers the psychologist a way to understand the child's competencies and vulnerabilities on the three levels of mental organization in everyday environments outside the clinical setting. However, in the empirical study the parent is generally the only informant. The psychologist rephrases and asks the questions to make sure that the parent understands and answers them with as much nuance as possible. Thus, in most cases, the reliability and validity study of the EDS-A hinges exclusively on the applicability of information from one of the parents (see Chapter 7).

The assessment guide consists of 19 questions regarding predisposing, perpetuating, provocative and protective factors and 39 questions regarding mental organizations. The 39 questions are grouped into the same hierarchic categories as the EDS-P but have a different distribution:

Autonomic level: 15 questions
Limbic level: 10 questions
Prefrontal level: 14 questions

### 4.2.6 THE EDS-A ITEMS

As mentioned above, the empirical study mostly only includes the parents as informants. The researcher is aware that the construct may change when other informants are added, and that in this study the validation of the EDS-A only applies to the use of parents as informants. In part two of the EDS-A, the questions are divided into the same three mental organizational levels as in the EDS-P and regard the same dimensions of emotional development. However, the focus is on different aspects than in the EDS-P. At the autonomic level, the questions assess whether the child follows circadian rhythms, regulates arousal appropriately for the context, has normal body sensations, is not under- or oversensitive and so on. At the limbic level the questions assess whether the child is emotionally well attuned with others, able to balance his or her temper, mood and emotions in social relationships with peers and adults and able to show empathy and sympathy towards others. At the prefrontal level the questions assess the capacity for volitional impulse regulation, delaying gratification and overriding impulsive desires to skip a task that seems boring. This level also includes questions aimed at assessing the child's mentalizing capacity in both calm and challenging situations.

Table 3: Examples of questions in the EDS-A

| | Question no. | Question | Purpose |
|---|---|---|---|
| **Autonomic level** | 8 | Does the child have a stable circadian rhythm, sleep pattern and so on? | The psychologist assesses whether the child is well regulated or has a dysfunctional circadian rhythm. |
| | 10 | How does the child react to sound, visual impressions, smell, taste and touch? | The psychologist assesses whether the child's sensory perception is well-regulated, too sensitive or too insensitive. |
| **Limbic level** | 24-27 | Is the child capable of showing emotional expressions of being joyful, sad, angry and fearful? | The psychologist assesses whether the child is good at showing emotional expressions non-verbally. |
| | 30 | Does the child find interest in social interactions with others? | The psychologist assesses whether the child is well regulated or either lacks personal boundaries or withdraws from |

| | | | |
|---|---|---|---|
| | | | the company of others. |
| **Prefrontal level** | 34 | Can the child control impulses? | The psychologist assesses whether the child can supress impulses or follows the smallest desire without hesitation. |
| | 37 | How does the child express shame or embarrassment? | The psychologist assesses whether the child shows appropriate expressions of shame and embarrassment according to the situation or fails to show any shame reactions at all. |

### 4.2.7 THE EDS SCALES

The EDS-P and the EDS-A scales are framed by the theoretical perspective of NADP. They consist of the three levels or domains of mental organization: autonomic, limbic and prefrontal:

*The autonomic level* concerns the ability to attend and react normally to different types of stimuli, ranging from no reaction to excessive sensitivity; to synchronize with another person and maintain focus and eye contact; and show facial expressions that lie within a normal range. It also deals with arousal regulation, entering into shared rhythms, becoming engaged and activated in an interaction, and moving smoothly and flexibly from one activity to another.

*The limbic level* concerns the extent to which the child shows authentic positive emotions, such as joy and happiness, as well as authentic negative emotions, such as mild anger, irritation, and sadness when frustrated. It also concerns the ability to take note of the psychologist's emotional reactions as evident through body expressions, gestures, facial expressions and prosody. This level further deals with the ability to take part in emotional attunement and shared attention in a balanced way.

At *the prefrontal level* concerns the child's ability to control impulses, delay gratification and regulate frustrations. It also assesses whether the child enters into social interactions and adheres to common ground rules, even if the child disagrees. This level also regards whether the child shows more complex feelings, such as shame and pride, and, also in play, shows the capacity to symbolize and mentalize. Finally, this level deals with the ability to reflect on what the child feels and thinks about him/herself and others with regard to desires, needs and social interactions.

The scoring system for both the EDS-P and EDS-A is a 4-point, Likert-type continuum, ranging from 1-4.

Table 4: Minimum and maximum scores of the EDS-P and EDS-A

| Min/max | Autonomic | Limbic | Prefrontal | Total |
|---|---|---|---|---|
| **EDS-P** | 13–52 | 12–48 | 29–116 | 54–216 |
| **EDS-A** | 15–60 | 10–40 | 14–56 | 39–156 |

### 4.2.8 PSYCHOMETRIC QUALITIES

As mentioned in Chapter 1, Hogrefe Ltd. is conducting a different investigation and analyses of the psychometric properties of EDS, including a factor analysis of items, concurrently with the empirical study presented in the current dissertation. A distribution version of EDS is under development and is expected to be finished in 2019. The test is a Danish project, so the development of the EDS is based on Danish 4–12-year-old children (Hart, Birck & Hellborn, 2016). The method of the empirical study will be elaborated in the following chapter.

## 4.3 SUMMARY

The EDS is measurement tool aimed at assessing 4–12-year-olds' emotional development, competencies and vulnerabilities. It consists of the EDS-P, which is a performance test, and the EDS-A, which is a structured assessment for gathering information to inform the psychologist about the child's emotional functioning level on personality traits in the natural environment that cannot be obtained through the EDS-P. The EDS-P and the EDS-A are designed to support each other. Both the performance test and the structured assessment are aimed at assessing functions on the three emotional levels: autonomic, limbic and prefrontal. Both the EDS-P and EDS-A are based on the theoretical perspective of NADP and consist of the three levels or domains of mental organization: autonomic, limbic and prefrontal.

# CHAPTER 5: METHODOLOGY AND DESIGN

## 5.1 THE EMPIRICAL STUDY

Based on the formulated research questions, Chapter 5 concerns the empirical part of the study. This chapter presents the methodology and epistemology of the study, describing the research design in detail, including information about the subjects, recruitment, data collection and procedure as well as the measures and method of statistical analysis. This chapter also details how the analysis will be performed and presents the statistical hypothesis and control variables.

## 5.2 METHODOLOGY

Qualitative and quantitative results used in combination are highly informative, which is the reason why many researchers today use mixed methods (Brinkmann & Tanggaard, 2015; Michell, 2003). However, this empirical study uses a fixed design with quantitative data and statistical analysis, as the research design solely addresses the reliability and validity of the EDS. In the process of conducting the study, a post-positivist methodology is incorporated into the design to ensure reliable and valid findings (Coolican, 2009).

### 5.2.1 POST-POSITIVISM AND FIXED QUANTITATIVE DESIGN

The post-positivist view is that research evidence is imperfect and fallible, and we should always be guided by the best knowledge we have at the time. Methods and conclusions should be examined to reduce possible bias and establish reliability and validity (Phillips & Burbules, 2000; Robson & McCartan, 2016). The researcher's worldview under the post-positivist paradigm is that empirical design consists of collecting data and testing whether the research object, in this case the EDS, is supported or requires revision, thus calling for further research. In the present empirical study this is achieved by formulating specific research questions and detailed hypotheses and testing them using a fixed correlational design using the EDS tool developed within the NADP framework.

A fixed quantitative design that rests on a post-positivistic approach does not rule out subjectivity as an influencing factor, and it does include some degree of qualitative judgement, despite its aim of objective analysis, as the research questions determine the methods and paradigm (Robson & McCartan, 2016). In the present research study, the researcher seeks to balance a holistic, multilevel worldview with an understanding of specific aspects of emotional competencies. Within a post-positivist perspective,

the goal is to transform these aspects into a fixed correlational design, while remaining true to the holistic, multilevel worldview to enable a quantitative study of reliability and validity. In this empirical study, the researcher thus seeks to expand her knowledge and research skills by asking questions that call for the field of fixed designs and quantitative methods of analysis.

### 5.2.2 PRAGMATISM AND POSITIVE SCIENCE

Although the methodology in this research design rests on post-positivist approach and a fixed correlational design, the underlying attitude is also shaped by pragmatism: a concern for practical matters that is guided by practical experiences rather than solely by theory. In a pragmatist worldview, values play a big role when researchers conduct research and draw conclusions because reality is influenced by the internal world of human experience, and knowledge is both constructed and based on the reality of our lived and experienced world. No current beliefs and research conclusions are viewed as perfect, certain or absolute, and observations, experiences and experiments are all useful ways to gain an understanding of people and the world, just as all knowledge is tentative and variable over time (Johnson & Onwuegbuzie, 2004; 2007; Robson & McCartan, 2016). As emotional competencies are considered complex – consisting of communicative and emotional skills, personal traits, and characteristics that all are influenced by both nature and nurture – they cannot be reduced to scales and numbers.

As there are multiple possible explanations, some will be better than others, and one must be wary to avoid the pitfall of reductionism (Jacobsen, 2012; Robson, 2011). In keeping with the pragmatist view, this study is based primarily on a deductive stance, but it is concerned with a constructivist and holistic understanding based on pragmatism. The research design in this study is based on a fixed correlational design and is only a part of the effort to develop and design more structured measurement tools based on NADP into the clinical work. The assessment of emotional development, competencies and vulnerabilities must be based both on measurement tools and structured assessment methods in order to obtain relevant structured information to guide the intervention (Poulsen & Simonsen, 2017).

As stated in Chapter 2, regardless how objective an assessment method or a test might seem, assessment and research will always contain an element of subjectivity. The researcher's beliefs, values and expectations can influence the research process at virtually any stage (Kazdin, Rosenthal & Rosnow, 2009). There is no single valid method in science, and the research design will always involve subjective perceptions and decisions (Nunnally & Berstein, 1994). It is important to bear in mind that the results of tests and other measurement tools are never static and permanently current, only snapshots in time. Also, the measures in this empirical study oversimplify reality and cannot stand alone in an evaluation, because, as mentioned above, emotional development is complex, multilevel and multifactorial. The task of this empirical

study is to get as close as possible to objective knowledge and to be as explicit as possible about the subjective aspects. The goal is to make every choice, interpretation and limitation clear and transparent to the reader.

## 5.3 PRESENTATION OF THE RESEARCH DESIGN

Briefly summarized, the research design is based on a fixed quantitative approach in order to investigate the psychometric properties of the EDS. In the external validity investigation, the EDS is correlated with the MIM-P and the NMI and with two standardized questionnaires, the Parent Stress Index (PSI) and the Parent-Child Relationship Inventory (PCRI). The data comes from video recordings, performance tests, structured evaluation, structured assessment and standardized questionnaires.

In the study, a convenience sample was used, as no power calculation was made beforehand to determine the appropriate sample size. The population was determined by what was practically possible within the resource limitations of the study.

### 5.3.1 RECRUITMENT OF PARTICIPANTS

The children participating in the empirical study were recruited in collaboration with the municipal day family treatment centre. Together with one of their parents the children were recruited at the beginning of their treatment course at the family treatment centre. All families referred to the centre with a 4–12-year-old child had a probability of being sampled. The sampling process was carried out by the psychologists among the families that were referred to the centre during the data collection period and accepted the invitation to take part in the empirical study.

The staff, consisting of family therapists, pedagogues, social workers and two psychologists (at one of the family centres, four psychologists), were in charge of recruitment and data gathering in the study. The two (or four) psychologists decided which families to invite. This selection aimed to protect vulnerable families and also included an evaluation process aimed at preventing drop-outs during the data collection period. In order to blind the study as much as possible, the researcher did not take part in selecting and approving the families.

### 5.3.2 INCLUSION AND EXCLUSION CRITERIA

None of the referred families were excluded because of any kind of abuse and/or psychological disorders or diagnoses, as these conditions are often a feature among vulnerable families. To be sure to recruit enough representative subjects and to avoid excluding families due to abuse or mental issues that were detected later, these features were not exclusion criteria.

### 5.3.3 PARTICIPANTS

Initially, 36 families agreed to participate in the empirical study, but one family was excluded due to incomplete answering of items. The mean age of the children was 8.58 years (*SD* = 2.16), boys; 54.3%, girls; 45.7%. The children were referred together with one of their parents. In the empirical study, 80% were mothers and 20% fathers.

Table 5: Dyad constellation of gender between parent and child

| Gender dyad | Mother | Father |
|---|---|---|
| Girl | 13 | 3 |
| Boy | 15 | 4 |

Prior to referral to the family treatment centre, 65.7% of the children were not diagnosed, while 34.2% had a variety of psychiatric diagnoses. The reasons for referral included problems related to the child (54.3%), problems related to the parent-child relationship (34.4%) and problems related to the parent (11.4%). The research study was organized to recruit families in a way that represented most parts of Denmark, from east to west (51.42% Zealand; 48.57% Funen/Jutland).

All 35 children completed the first testing of the EDS-P and 35 matching EDS-A protocols. In the EDS-P retest, it was only possible to obtain 26 datasets, as the most vulnerable children did not want to take part in the retesting.

### 5.3.4 ETHICAL CONSIDERATIONS REGARDING THE PARTICIPANTS INVOLVED IN THE EMPIRICAL STUDY

Regarding ethical considerations there are several pertinent factors. Brinkmann (2015) highlights four important points to consider in good ethical practice: 1) informed consent, meaning that research participants know what they are participating in, and what their participation entails; 2) confidentiality (anonymity); 3) consequences for the general public of research results from a small population and 4) the researcher's role, which consists of using his/her experiences and sensitivity in conducting the research.

In this research study, the researcher strove to comply with all ethical rules and considerations. As the families were considered to be in a vulnerable situation when they were referred to the family-care centre, they were treated with a high degree of respect and given as much information as possible without overwhelming them with too much or overly complex information. If the parents who were referred for family treatment declined being a part of the research study, this was respectfully accepted.

All tests were undertaken by psychologists working as family therapists at the family centre. During the uptake they were aware if the responses induced emotions that were difficult for the participants to handle. Testing was time-consuming, but apart from retesting the children, the psychologists found it meaningful to conduct the test, as it provided them with a range of information that could be used in their assessment to plan the intervention for family treatment, which was directly beneficial for the family.

Regarding the informed consent the parents included in the study had been informed of the purpose of the study and of the risks and benefits of participating. They were explained how the collected data was going to be stored, informed of their rights and told that the researcher was informed about the results. The parent who had custody of the child signed an informed consent form (Appendix D) and a consent form for the use of video recordings from the EDS-P, MIM-P and NMI sessions (Appendix E). The child was not asked to sign, as that was not part of normal practice, and because it tends to weaken the parent's authority and place an undue burden of responsibility on the child. The consent forms were formulated in plain language in order to make the content as accessible to the parent as possible, and the psychologist who introduced the parent to the research study explained the content of the consent form, to ensure that it was understood.

The psychologists who participated in the study are all subject to the same requirements concerning confidentiality and storage of data that apply to their employment in the municipality, as described in the Danish Data Protection Act.

All confidential material regarding the participants was delivered anonymously to the researcher. The answer sheets were delivered on paper to ensure that the data was only available within the SPSS statistic system. The test results and discussion of the results are available to the public in this dissertation and in peer-reviewed articles.

### 5.3.5 ETHICAL APPROVAL OF THE STUDY

The study follows the ethical guidelines specified in the Danish Code of Conduct for Research Integrity and in the regulations for handling personal data (http://www.informationssikkerhed.aau.dk/persondata/; more info on research conduct at http://www.mt-phd.aau.dk/about/). An application for approval of the research project was sent to the health research ethics committee on 11 May 2016.

The research study was considered to be a low-risk research project with adequate ethical considerations by the Den Videnskabsetiske Komité for Region Nordjylland [Health Research Ethics Committee for the North Denmark Region] on 14 June 2016 (Appendix F), and exemption from formal ethics review was granted. Another application was sent to "Datatilsynet" (Danish Data Protection Agency). On 6 June 2016 the agency replied that private research projects that were approved by the

research ethics committee no longer required the agency's approval (Appendix G).

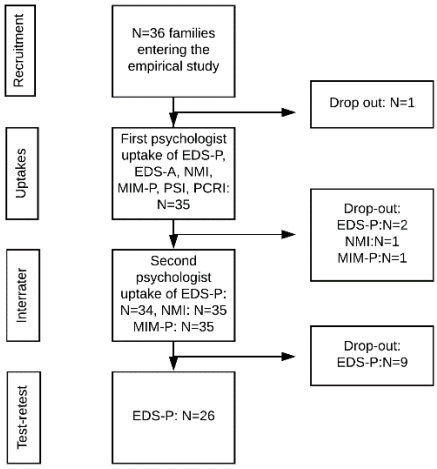
## 5.4 DATA COLLECTION METHOD

Included were eight day-family treatment centres located in various parts of Denmark. Seven of the family centres each assigned two psychologists to administer the tests; at one family centre, four psychologists administered the tests. Eighteen psychologists participated in the experimental design. The same two psychologists at each treatment centre who were in charge of recruiting the families were also in charge of conducting the assessments/tests. The children and parents were recruited at the beginning of their stay at the treatment centre. After recruitment, the parent was introduced to the research study at an informal meeting with one of the psychologists, and the parent then informed the child. Afterwards, the psychologist gave the child an age-appropriate introduction to the study.

To ensure interrater reliability, the EDS-P, the NMI and the MIM-P were video-recorded to allow for blinded ratings. To ensure test-retest reliability within one to seven weeks, a retest of the performance part of the EDS-P was conducted before the intervention was implemented. The test material was returned to the researcher, except for the EDS data, which was sent to Hogrefe Ltd. to be included in the standardization process. Once the EDS data was registered here, it was passed on to the researcher. Hogrefe Ltd. sent the data from the EDS to the researcher in an Excel spreadsheet.

The referred child's mother or father participated with the child in the MIM-P, was interviewed for the NMI and EDS-A, and completed the standardized questionnaires (PSI & PCRI).

Figure 5: Flowchart of data collection




## 5.5 RECRUITMENT OF PSYCHOLOGISTS

Nine day-family treatment centres were invited to take part in the empirical study. One rejected the invitation because of the time-consuming data collection process. As it was not possible to train the psychologists in the newly developed EDS, NMI and MIM-P, a criterion for the selection of the psychologists was that they had some degree of experience with psychological testing and some knowledge of NADP. The day family treatment centres that were included had previously received supervision or training in NADP from the researcher or her colleagues. The prerequisite for entering into the research project was that at least two psychologists were employed at the family treatment centre and would be responsible for the data collection. All eighteen raters were clinical psychologists. Sixteen of the psychologists were women, two were men. The assigned psychologists were in charge of recruiting the children and parents and of conducting the tests.

### 5.5.1 TRAINING OF THE PSYCHOLOGISTS

The attending psychologists received the test materials in August 2016. To ensure that all psychologists received the same training, they took part in a two-hour webinar on the EDS on 12 August together with approximately 70 psychologists recruited by Hogrefe Ltd. to handle the data collection. A four-hour workshop on the MIM-P, NMI, PSI and PCRI was conducted for the eighteen psychologists participating in the empirical study. The workshop was held on Zealand on 26 August 2016 and in the west of Denmark for the Funen/Jutland centres on 2 September 2016. To ensure that the psychologists understood the uptake and rating of NMI, a preliminary version was

developed with examples of answers and scorings. The preliminary version consisted of video vignettes from teaching materials used in mentalizing training based on 15 separate questions answered by different parents. The video vignettes were sent to the psychologists via a streaming service, and the rating was conducted by them in September 2016. The developers of the NMI were also included in the preliminary version. Seventeen psychologists answered the preliminary version. The interrater reliability analysis revealed good results (ICC= .895***).

## 5.6 THE HOGREFE LTD. SAMPLE

By the time the empirical design was conducted, Hogrefe Ltd. had gathered a preliminary sample of 213 participants; the uptake of this sample was handled by 64 psychologists working at regional educational-psychological advisory centres in Denmark. By the end of the present research project, Hogrefe Ltd. has gathered a sample consisting of 352 children, 176 boys and 176 girls. They have conducted a confirmatory factor analysis (CFA using the Lavaan package in R) of all items and scales, a reliability analysis using Pearson correlations between all the scales and an analysis of internal consistency using Cronbach's alpha and split-half coefficients.

No external validity study was conducted in the Hogrefe Ltd. study, and no significant variation was found in the preliminary ad hoc sample regarding the children's age and gender: the mean age of the preliminary ad hoc sample from Hogrefe Ltd. used in the current study was 8.53 years (*SD* = 6.69) – boys 54.5%; girls: 45.5%. The group of referred children was 13.6%, while 86.4 % was non-referred. As the same psychologists who carried out the uptake and rated the test were also in charge of selecting the population, it was not possible to blind the groups of non-referred and referred.

## 5.7 REFERRED AND NON-REFERRED GROUPS

In the study, the referred group consists of 35 participants from the empirical study and 29 participants from the preliminary ad hoc sample from Hogrefe Ltd. The non-referred group consists of 184 children from the preliminary ad hoc sample from Hogrefe Ltd.

## 5.8 PROCEDURE AND SETTING

Two psychologists from seven of the participating family treatment centres and four psychologists from one participating family treatment centre, who took part in the data collection, received the test material approximately one month before the first data collection period, so they could familiarize themselves with it. They were assigned the roles of psychologist 1 and psychologist 2 in the EDS-P, MIM-P and NMI for the purposes of the interrater reliability study. All the assessment sessions were video-recorded by psychologist 1, so that psychologist 2 could conduct the blinded analysis. Psychologist 1 and psychologist 2 were requested not to be acquainted with each

other's scorings. The EDS structured assessment (EDS-A) was only conducted by one of the psychologists, and the standardized questionnaires were conducted with help from one of the psychologists. Because the psychologists had to manage the data collection during their normal working hours, they were under no pressure concerning the sequence of the uptake of the different measurement tools. As described in Paper 3 no study of test-retest reliability was conducted regarding the EDS-A, as it would have been overwhelming to ask the parent to complete the same extensive structured interview so shortly after the first. An interrater reliability could have been conducted based on a video recording of the uptake of the EDS-A interview and rated by psychologist 2, but to avoid overloading the involved psychologists the EDS-P was given priority.

## 5.9 SEQUENCES IN THE RESEARCH DESIGN AND EMPIRICAL STUDY

The data collection began in August 2016 and concluded in December 2017. It fell into four phases: initiation, data collection, data processing and discussion and analysis.

Figure 6: Chart of sequences of the empirical study

| **Initiation phase May–September 2016** | **Data collection phase October 2016–July 2017** | **Data processing phase August–December 2017** | **Analysis and discussion phase January–July 2018** |
|---|---|---|---|
| 1. Search for eight family centres and min. sixteen psychologists for the empirical design.<br>2. Email from the Danish Data Protection Agency and the National Committee on Health Research Ethics with approval of the empirical design.<br>3. Application sent for licence to buy materials for PCRI for all psychologists in the empirical design.<br>4. Preparing consent forms for parent participating in the research project.<br>5.Finishing the preparation of the MIM-P and NMI: completing the tests and manuals, layout and print.<br>6. Permission from Arietta Slade to use several questions from the PDI in the NMI and from Phyllis Booth to use the MIM and add psychometrics. | 1. Initiating the empirical design.<br>2. Data collection in the empirical study with a follow-up on unanswered questions.<br>3. Preparing, sending and receiving questionnaires to/from psychologists with information about the participating families.<br>4. Preparing, sending and receiving questionnaire to/from psychologists regarding their qualifications and experience.<br>5. Receiving Excel spreadsheet with | 1. Processing data from the empirical study through SPSS to calculate reliability and validity.<br>2. Finishing the reliability and internal consistency study of the EDS.<br>3. Finalizing a journal article proposal with the results of the psychometrics of the reliability and internal validity study. | 1. Processing data from the empirical study through SPSS regarding external validity.<br>2. Processing the results of the external validity study<br>3. Preparing the preliminary doctoral defence in May.<br>4. Finishing the thesis frame or "kappa" with results and discussion of the results. |

| | | | |
|---|---|---|---|
| 7. Sending test materials to the psychologists in the research project, together with an electronic logbook.<br>8. Training psychologists for the EDS, NMI, and MIM-P: 26 August (Zealand group) and 2 September (Funen/Jutland group).<br>9. Preparing test trial of the NMI, sending it to psychologists, receiving their scores and calculating the interrater reliability score through SPSS. | EDS results for the 36 participating children.<br>6. Working out hypothesis regarding research project deduced from the data from the empirical study.<br>7. Finalizing two journal article proposals on NADP. | | |

### 5.9.1 MEASURES

The EDS is described in Chapter 4. As described above, the EDS is tested for external validity using the two newly developed measurement tools the NMI (now the EMS) and the MIM-P and the two standardized questionnaires the PSI and PCRI. To ensure interrater reliability and internal consistency of the two newly developed measurement tools, the NMI and the MIM-P, an analysis was conducted. The results of the analysis revealed a good reliability of both the NMI and MIM-P. The analyses of interrater reliability and internal consistency are found in Appendix O. The description of the history behind the NMI and MIM, the set-up, the activities and questions, the dimensions, the interrater reliability, internal consistence and psychometric qualities regarding mentalization and caregiver-child intersubjectivity are outside the scope of this dissertation, but as the two newly designed measurement tools were originally described as a part of the thesis, the researcher is in the process of planning a manuscript for an upcoming article submission together with the literature review.

Also, the properties of the PSI and PCRI are described in this article together with the construct validity between the above-mentioned measurement tools.

### 5.9.2 THE NEUROAFFECTIVE MENTALIZING INTERVIEW (NMI)

As described in Chapter 1 ‘mentalizing capacity’ refers to the ability to attend to mental states in an attempt to understand actions based on intentional mental states (Bateman & Fonagy, 2012). Language is a key mechanism and combines actions, sensations and emotional perception through storylines in ways that organize both inner and outer reality (Fonagy, Gergely, Jurist, & Target, 2002). The concept of mentalizing was originally operationalized by the development of the Reflective Functioning Scale (RF-scale) and used for research purposes. It has been difficult to develop a ‘clinical-friendly’ version of the mentalizing interview consisting of a structured interview with psychometric measures for assessing adults’/parents’ mentalizing capacity.

Over the past year, the researcher together with three clinical psychologists has developed a short-structured interview and a rating scale using aspects of the RF-scale and expanded it with the NADP understanding. The NMI is derived from the theory of mentalizing developed on the basis of research by Fonagy and colleagues (Fonagy, Target, Steele, & Steele, 1998; Fonagy & Ghinai, 2008; Ha et. al 2013). For ethical reasons, in connection with the development of the NMI Peter Fonagy was contacted, who declared that the development of the NMI did not conflict with his interests. Also, Arietta Slade was contacted, who gave her permission to use several questions from the Parent Development Interview (PDI) in the NMI. So far, there is no published research on the NMI.

The purpose of the development of the NMI is to offer a brief interview to be used in clinical settings without requiring too much training or being too time-consuming. The goal has also been to develop an interview that addresses implicit mentalizing, connecting mental language with body language and synchronization capacity.

#### 5.9.2.1 The NMI Protocol

The NMI consists of 14 questions, which are asked and answered in a video-recorded session. The 14 questions are divided into three domains:

Part A: View of own parenting (4 questions)
Part B: Perception of the child and of own relationship with the child (5 questions)Part C: Perception of own childhood attachment relationships (5 questions)

#### 5.9.2.2 The Rating Scale

The scoring of the interview is based on the video recording. Each answer is scored separately on a five-point, Likert-type continuum (0–4), ranging from low to high mentalizing capacity. The scale is based on the degree of mental language, body language and interaction with the interviewer.

A total score is calculated as an average of replies to the 14 questions. The content of the mental language at both the highest and lowest level of mentalizing is also taken into account.

Table 6 Minimum and maximum scores

| | **Part A:** | | | **Part B:** | | **Part C:** | | **Total** | |
|---|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. | Min. | Max. | Min. | Max. |
| **NMI** | 0 | 16 | | 0 | 20 | 0 | 20 | 0 | 56 |

#### 5.9.2.3 Psychometric Qualities

The NMI is under development, and no standardization has yet been made. It has been revised since the research project was conducted and now consists of 13 questions, as

one question in part C was dropped. The name also changed, to Emotional Mentalizing Scale (EMS).

### 5.9.3 THE MARSCHAK INTERACTION METHOD (MIM)

The first version of the MIM was constructed by the psychologist Marianne Marschak in 1958 and named the Controlled Interaction Schedule (CIS). In the 1960s it was renamed the Marschak Interaction Method (Booth et al, 2011; Booth, 2012). The MIM is a structured play-based dyadic observation assessment method aimed at gaining insight into the quality and nature of the caregiver-child relationship, that is, the intersubjectivity between caregiver and child. The method is based on attachment theory and can be applied to children of all ages together with their caregiver. The MIM assesses the quality of both the caregiver's and the child's behaviour as a way of uncovering strengths and vulnerabilities in the close relationship (Booth et al., 2011; Olsen-Kludt, 2013). The MIM has not been standardized, and no psychometric qualities are mapped.

#### 5.9.3.1 Scoring

The qualitative assessment is based on the video recording and covers the four dimensions of structure, engagement, nurture and challenge (Booth et al., 2011; Olsen-Kludt, 2013).

In the empirical study the qualitative assessment, was converted into a quantitative study, and psychometric qualities with a rating scale were developed with respect for the four dimensions and was given the name MIM-P. The structure dimension was divided into two: structural macro-regulation and relational macro-regulation. For ethical reasons, in connection with the development of the psychometric properties, the researcher contacted Phyllis Booth, who declared that she welcomed the development of the MIM-P, which did not conflict with her or her organizations interests.

#### 5.9.3.2 The MIM-P Protocol

The MIM-P protocol consists of 10 activities, which are video-recorded.

Each activity incorporates a specific observation of three to four dimensions, which are later scored separately for the parent, child and their mutual interaction.

#### 5.9.3.3 Administration and Rating Scale

The MIM-P is scored by the psychologist/rater based on the video recording of the MIM-session. The psychologist/rater scores one activity at a time by pausing the recording after each activity.

The rating scale is a nine-point Likert-type continuum within each of the five

dimensions, in relation to both the caregiver's ability to support the child, as described in the dimension, and the child's ability to accept what the caregiver offers within each dimension. The rating scale is as follows:

Very good: 8–9 points
Good: 6–7 points
Inconsistent: 4–5 points
Inadequate: 2–3 points
Lacking: 1 point

In the summing up of scores, the caregiver's and the child's ability within each dimension are calculated separately and added up in an interaction score, first for each dimension and then in an overall interaction score. The interaction score is calculated by multiplying the parent's total score by two, adding the child's total score and dividing this aggregate score by 3. This because the parent's influence on the interaction is judged as being higher than the child's.

Table 7: Minimum and maximum scores in the MIM-P

| | **Parent** | | **Child** | | **Interaction score** | |
|---|---|---|---|---|---|---|
| | **Min.** | **Max.** | **Min.** | **Max.** | **Min.** | **Max.** |
| Structural macro | 10 | 90 | 10 | 90 | 10 | 90 |
| Relational macro | 10 | 80 | 10 | 80 | 10 | 80 |
| Engagement | 10 | 36 | 10 | 36 | 10 | 36 |
| Nurture | 10 | 45 | 10 | 45 | 10 | 45 |
| Challenge | 10 | 36 | 10 | 36 | 10 | 36 |
| Total | 60 | 287 | 60 | 287 | 287 | 287 |

#### 5.9.3.4 Psychometric Qualities

No standardization of MIM-P has yet been developed, as the MIM-P was developed for this empirical study.

### 5.9.4 STANDARDIZED QUESTIONNAIRES

It has proven difficult to find relevant validated tools to correlate with the EDS, as evident from the literature review (Chapter 3). No measurement tools were found that match the exclusive focus on emotional development as the EDS. Hence, the EDS is correlated with the NMI, MIM-P and two evidence-based parental questionnaires in order to investigate the correlation between emotional development, the parent's mentalizing capacity and parent-child intersubjectivity. Comparing observed behaviour, as in the EDS-P, with self-report questionnaires from caregivers may present certain obstacles, because the caregivers may not answer truthfully, may not

have an accurate picture of their behaviour or may misunderstand questions. The results of the validity study of the correlation between the EDS and the PSI and PCRI will show whether there is a correlation between the child's emotional development and the parent's understanding of him/herself and of his or her relationship with the child.

#### 5.9.4.1 The Parenting Stress Index (PSI)

The PSI is a clinical and research-based self-report questionnaire with 120 test items developed by Richard Abidin (1995). It is described as a screening and diagnostic assessment technique, designed to yield a measure of stress in the parent-child system of parents with children aged 0–12 years. Its intended primary value is to identify parent-child systems that are under stress and at risk of developing dysfunctional parenting behaviour affecting the child's mental states and behaviour (Abidin, 1995).

The questionnaire consists of a five-point, Likert-type continuum, ranging from 'strongly agree' to 'strongly disagree'. The PSI yields a total stress score and three domain scores: Child Domain, Parent Domain, Life Stress. There are six subscale scores for the Child Domain and seven subscale scores for the Parent Domain can be found in appendix I. High scores indicate problems in the specific domain. High scores for Total Stress are associated with parent-child systems that are under stress and at risk of developing dysfunctional parenting behaviour or mental or behaviour problems in the child. A high score for Life Stress indicates parents who find themselves in stressful situational circumstances and reflects the level of stress outside the parent-child relationship.

In their review of the PSI, Heinze and Grisso (1996) described that the PSI is analysed on a normed sample of 2633 parents with most children aged less than 5 years. Alpha reliability coefficients measuring the internal consistency of the subscales, each domain, and the total score were high (0.70–0.95). Multiple test-retest reliability studies found the temporal stability of the test to range from 0.55 to 0.96. The PSI showed significant correlations with multiple tests measuring the same construct (ibid.). The test was chosen for the current study, because it is rich in detail regarding the child and has high validity and reliability.

#### 5.9.4.2 Parent-Child Relationship Inventory (PCRI)

The PCRI is a self-report questionnaire consisting of 78 items that examines how caregivers view the task of parenting, and how they feel about their children. It identifies and specifies aspects of the parent-child relationship that may cause problems and also gives an overall picture of the quality of the relationship. It was designed for use both with mothers and fathers of 3–15-year-old children and offers a quantified assessment of the parent-child relationship. It identifies specific areas where problems may occur and includes seven distinct scales. The subscales can be found in Appendix I. All the items have a four-point, Likert-scale response format, ranging from 'strongly agree' to 'strongly disagree'. Of the 73 items included in the content scale, 26 are keyed positively and 47 are keyed negatively. If an item is

positively keyed, a response of 'agree' increases the score, and vice versa.

The protocol has two validity indicators: Social Desirability (SOC) and Inconsistency (INC). A low SOC score suggests that the parent is giving distorted responses that portray the parent-child relationship unrealistically positive, while INC suggests inattentive or random responding. Consistent with the idea that parenting skills define a positive dimension, high scores on the PCRI scales indicate good parenting skills, while low scores indicate poor parenting skills (Gerard 2010).

Heinze and Grisso (1996) reported that the normative sample for the PCRI consisted of 1139 parents from around the United States. The coefficient alpha values for the subscales ranged from 0.70 to 0.88, and the one-week test-retest reliability of 22 subjects ranged from 0.68 to 0.93 for various subscales. The five-month test-retest reliability of 82 parents for the subscales, ranged from 0.44 to 0.79. Heinze and Grisso (1996) concluded that these results suggest good internal consistency. However, there is a need for more research on the validity with research into clinical applications of the test (ibid.). The PCRI test was chosen for the present study, because it has highly relevant features, it depicts the parent's observations of the child and has fairly good validity and reliability.

#### 5.9.4.3 Translation of the Standardized Questionnaires

The PSI questionnaire has been translated into Danish for commercial use by Hogrefe Ltd. but using the original manual and norms. As the PSI has been professionally translated and published by Hogrefe Ltd., the Danish-language questionnaire was used in this study. In her PhD thesis Jacobsen (2012) conducted a translation of the PCRI. She relied on one of the supervisors of her study and his statement to ensure the quality of the translation and the use of the test. Special permission has been given to the researcher to use this translation of the PCRI by the test publisher (Appendix H).

## 5.10 STATISTICAL ANALYSIS OF THE EDS

The statistical analysis compared results from the EDS-P, EDS-A, NMI, MIM-P and the standardized questionnaires PSI, PCRI. SPSS Version 24 was used for all the statistical analyses. All the participants in the empirical study were referred, while 86.6% in the preliminary ad hoc sample from Hogrefe Ltd. were non-referred, which made it possible to correlate the EDS with a referred and a non-referred group. Unfortunately, it was not possible to blind the groups of referred and non-referred, as the psychologists were involved in recruiting the children for the study and thus knew beforehand which children were referred or diagnosed, and which children were non-referred.

The analysis includes interrater reliability, test-retest reliability, internal consistency, and concurrent and predictive validity of the EDS-P and ES-A. The analyses also

include construct validity based on correlations between the EDS and the NMI, MIM-P, PSI and PCRI.

The researcher's newly acquired statistical analysis skills are anchored in the guidance of Hanna & Dempster (2012), and specific statistical analysis theory was obtained from several sources (Coolican, 2009; Fleiss, 1981; Robson, 2016).

### 5.10.1 RELIABILITY

The reliability of a measurement tool reflects the degree of consistency between multiple measurements of the same phenomenon. The rationale behind a reliability study is to distinguish 'true' test scores from 'measurement errors' that may stem from situational aspects of the person being assessed or the psychologist/rater. The 'true' score is, of course, an abstraction that cannot provide an objective goal. Various approaches have been developed for measuring reliability. High reliability does not secure validity, as a test may well have high reliability without necessarily measuring what it is intended to measure (Coolican, 2014; Poulsen and Simonsen, 2017).

Generally, a reliability analysis is conducted because if an agreement among raters is good, there is a good probability, but no guarantee, that the ratings reflect the dimensions they are supposed to reflect (Fleiss, 1981). To determine the quality of the measurements, that is, their consistency and repeatability, the focus of the research study is to estimate reliability. One cannot expect any testing to correlate perfectly. The main use of reliability coefficients is therefore to communicate the repeatability of the results (Nunnally & Bernstein, 1994). In the empirical study, a reliability study concerning internal consistency, test-retest reliability and interrater reliability was conducted.

#### 5.10.1.1 Interrater Reliability

Interrater agreement between psychologist 1 and psychologist 2 was measured. Interrater reliability studies are particularly important when the test instrument is based on observer assessments, as this type of testing is susceptible to the psychologist/rater's subjective assessment (Poulsen & Simonsen, 2017). As an intraclass correlation coefficient (ICC) is a widely used measure of interrater reliability for quantitative ratings, it was used to analyse the significant difference between scores from psychologists 1 and 2. An ICC less than 0.40 was regarded as poor; 0.40–0.59 as fair; 0.60–0.74 as good; and 0.75–1.00 as excellent (Cicchetti, 1994).

#### 5.10.1.2 Test-Retest Reliability

In the test-retest reliability study, the consistency of individual test scores was investigated based on two tests conducted at intervals of one to seven weeks. It assesses test-retest reliability for the EDS by comparing scores from the first assessment session with the second. Here, there is a risk of a learning effect for the

test that makes it easier for the child to perform the tasks, or conversely, a risk that the child gets bored and does not make the same effort as the first time he or she did the test.

As Pearson's correlation is widely used in parametric non-experimental studies, this measure was calculated in the test-retest study regarding the EDS. Pearson's Correlations Coefficient (*r*) measures the strength and direction of a linear relationship between two variables. The value is interpreted by the following values: –1 shows a perfect negative linear relationship; –0.70 shows a strong negative linear relationship; –0.50 shows a moderate negative relationship; –0.30 shows a weak negative linear relationship; 0 shows no linear relationship; 0.30 shows a weak positive linear relationship; 0.50 shows a moderate positive relationship; 0.70 shows a strong positive linear relationship; and 1 shows a perfect positive linear relationship.

#### 5.10.1.3 Internal Consistency

Internal consistency investigates how different scores relate to each other (Nunnally & Bernstein, 1994). One of the purposes of the empirical study is to investigate how autonomic, limbic and prefrontal scores and total score in the EDS-P and the EDS-A correlate both individually and together. The statistical analysis is conducted both for the empirical study and for the preliminary ad hoc sample from Hogrefe Ltd. For interpretation of internal consistency, Cronbach's alpha was used, and the value was interpreted as follows: alpha: ≥0.9 = excellent; 0.9–0.8 = Good; 0.8–0.7 = Acceptable; 0.7–0.6 = Poor; and > 0.5 = Unacceptable. The study of internal consistency only concerns first raters.

### 5.10.2 VALIDITY

The use of validity is formalized through the work of the American Educational Research Association, the American Psychological Association and the National Council on Measurement in Education and published as *Standards for Educational and Psychological Testing* (2014). A measurement tool's validity is concerned with ensuring that a measure actually measures what it claims to measure (Hanna & Demster, 2012). In other words, do the items or questions in the measure and the method of measurement accurately operationalize the construct of interest? Researchers typically discuss a variety of forms of validity to determine if the measure captures what it is designed for. The term validity is thus used in many different ways, and it is difficult to find consensus with the definition. In practice, there seems to be no consensus regarding the proper application of the term and the definition is somewhat vague and confused (Newton & Shaw 2013). In this dissertation three types of validity are used: Concurrent, predictive and constructive validity (Gustman, 2015; Furr, 2011).

This empirical study focuses mainly on concurrent and construct validity. In the analysis regarding concurrent validity, the EDS is analysed by correlating the

differences between referred and non-referred groups; predictive validity is used to investigate the progression between the autonomic, limbic and prefrontal levels; construct validity is used to correlate the EDS with the NMI, MIM-P, PSI and PCRI.

#### 5.10.2.1 Concurrent Validity

The concurrent validity tests analysed the ability of the EDS to differentiate between the referred and non-referred groups. An independent t-test was conducted for age groups (4–8 and 9–12-year-olds) and gender. An alpha level of .05 was used for all statistical tests. Where the assumptions were violated by the computed Levene test, a Mann-Whitney U test was conducted.

The concurrent validity was measured by analysing differences between referred and non-referred groups based on merging the empirical study sample (n=35) with the preliminary ad hoc sample from Hogrefe Ltd. (n=213), regarding both the EDS-P and EDS-A. This analysis was conducted both for the whole group of referred and non-referred participants and for the subgroups of 4–8 and 9–12-year-olds and gender groups. Among the groups of 4–8 and 9–12-year-olds the analysis was conducted by looking at age progression for emotional competencies between groups of referred 4–8 and 9–12-year-olds and between groups of non-referred 4–8 and 9–12-year-olds in order to analyse the age progression between the two groups. Also, an analysis was conducted between groups of non-referred and referred 4–8-year-olds and between groups of non-referred and referred 9–12-year-olds in order to compare levels of maturity between the same age groups of non-referred and referred. Regarding gender, the analysis was conducted by first conducting an analysis between groups of referred and non-referred girls and groups of referred and non-referred boys in order to reveal if there is a difference in emotional competencies between groups of referred and non-referred. Also, an analysis was conducted between groups of both non-referred and referred girls and boys to reveal if there is a gender difference between the two groups.

#### 5.10.2.2 Predictive Validity

To be able to test the hypothesis of progression of the autonomic, limbic and prefrontal levels in both the EDS-P and EDS-A, an analysis of predictive validity was conducted. An analysis of the progression was conducted by calculating the mean based on a percentage of max scores from both the empirical study sample and the ad hoc sample from Hogrefe Ltd. and merging it into one and creating a variable of referred and non-referred children. The statistical analysis was conducted by finding the mean percentage of autonomic, limbic and prefrontal scores, enabling correlating the three score levels. The mean scores were analysed across age groups of 4–8-year-olds and 9–12-year-olds, across gender and across differences between EDS-P and EDS-A. Normally, this analysis would have been conducted through an analysis of the internal consistency of both scales in relation to max/cut-off scores and not according to mean, which is the basis of Cronbach's alpha. In this study it was not possible to correlate the point scores to find the progression through a correlational analysis, as the factor and norm analysis have not been terminated. Because no cut-off scores or normal distribution curves have been calculated, the calculation of the mean is based on a

percentage of max scores in a speculative interpretation (*Standards for Educational and Psychological Testing 2014*).

Calculation for each scale of the EDS-P and EDS-A:

$$\frac{\text{Mean x 100}}{\text{Max score}}$$

#### 5.10.2.3 Construct Validity

In this study, the constructs consist of the items of the EDS-P protocol together with the EDS-A measured on a 0–4 Likert-like scale. Statistically, these points are assessed by correlating EDS scores with the NMI, MIM-P, PSI and PCRI. As both the NMI and MIM-P were newly developed assessment methods, they are first analysed for interrater reliability and internal consistency (Appendix O).

As Pearson's correlation is widely used in parametric non-experimental studies, this measure was conducted in the study of construct validity (Vaz et al., 2013). Pearson's correlation indicates the strength and the direction of the relationship between two variables. The value of *r* or a correlation of 0–.2 is considered weak; .3–.6 moderate; and .7–1 strong (Brace et al., 2006; Jacobsen & McKinney, 2014). An alpha level of .05 was used for all correlations. This is the most common correlation coefficient to be reported and is used as long as the variables is measured at the ratio or interval level, data for both variables follow a normal distribution, and no substantial extreme scores or outliers were found (Robson & McCartan, 2016), which was also the case regarding the EDS. In this study the construct validity was established by correlating the scales pairwise.

## 5.11 STATISTICAL HYPOTHESES

Prior to the statistical analysis the researcher had specific statistical correlations she wished to address in accordance with the research questions. The hypotheses derived from the research questions are described and divided into the following points.

**Regarding research question I**

Reliability

1. The test and retest rating of EDS-P correlates at significant levels on the autonomic, limbic, prefrontal and total scores
2. The EDS-P ratings of psychologists 1 and 2 correlates at significant levels on the autonomic, limbic, prefrontal and total scores.
3. There is internal consistency within the EDS-P scale including autonomic, limbic, prefrontal and total score.

4. There is internal consistency within the EDS-A scale including autonomic, limbic, prefrontal and total score
5. There is a significant correlation between the EDS-P and the EDS-A.

Concurrent validity

6. The EDS-P and the EDS-A can distinguish between groups of non-referred and referred 4–12-years-olds.
7. The EDS-P and the EDS-A can reveal a progression of emotional competencies between groups of referred 4–8 and 9–12-year-olds.
8. The EDS-P and the EDS-A can reveal a progression of emotional competencies between groups of non-referred 4–8 and 9–12-year-olds.
9. The EDS-P and the EDS-A can distinguish between groups of non-referred and referred 4–8-year-olds.
10. The EDS-P and the EDS-A can distinguish between groups of non-referred and referred 9–12-year-olds.
11. The EDS-P and the EDS-A can distinguish between groups of non-referred and referred girls.
12. The EDS-P and the EDS-A can distinguish between groups of non-referred and referred boys.
13. The EDS-P and the EDS-A can distinguish between groups of referred girls and boys.
14. The EDS-P and the EDS-A can distinguish between groups of non-referred girls and boys.

**Regarding research question II:**

Predictive validity

15. The two scales EDS-P and EDS-A are predictive of emotional developmental progression as described in NADP.

**Regarding research question III:**

Construct validity

16. There are significant correlations between scores of the EDS-P/EDS-A and the PSI/PCRI.
17. There are significant correlations between scores of the EDS-P/EDS-A and the NMI.
18. There are significant correlations between scores of the EDS-P/EDS-A and the MIM-P.

## 5.12 SUMMARY

The empirical study uses a fixed design with quantitative data and statistical analysis to assess the reliability and validity of the EDS. The research design incorporates post-positivist scientific methods and the underlying attitude behind the study rests on pragmatism.

The empirical study consists of 36 4–12-year-olds with one of their parents recruited from eight municipal day family treatment centres. The statistical analysis compares results from the EDS-P, EDS-A, NMI, MIM-P and the standardized questionnaires PSI and PCRI. All the participants in the empirical study were referred, while 86.6% in the preliminary ad hoc sample from Hogrefe Ltd. were non-referred. The analyses include interrater reliability, test re-test reliability, internal consistency and concurrent and predictive validity of the EDS to answer specified questions and comparisons.

# CHAPTER 6: RESULTS

## 6.1 RESULTS FROM THE PSYCHOMETRIC ANALYSES

Chapter 6 presents the results of the statistical analyses. In this chapter the results from the psychometric analyses regarding the EDS are described. Paper 3 is first summarized with the results from the interrater reliability, test-retest, internal consistency and concurrent validity regarding the EDS, continuing with the predictive validity of the progression of the scores of the EDS-P and EDS-A. The closing section describes the construct validity for the EDS-P and EDS-A correlated with the NMI, MIM-P, PSI and PCRI. As mentioned above, the psychometric properties of NMI and MIM-P was investigated, but as they were not a part of the measures of the main study, the analysis of the interrater reliability study and test-retest is inserted in Appendix J.

## 6.2 RELIABILITY, INTERNAL CONSISTENCY AND CONCURRENT VALIDITY OF THE EDS-P AND EDS-A

Before conducting the statistical analysis, a descriptive statistic of the raw data was compiled showing measures of central tendency and dispersion. The dataset was analysed for outliers and skewness, and the dispersion was measured through standard deviation. As none of the data revealed excessive diversity in mean, standard deviation, skewness and kurtosis, the dataset was concluded to qualify for parametric correlation analyses.

### 6.2.1 PAPER 3

**Emotional Development Scale: Assessing 4–12 Year Olds' Emotional Capacity**
This article outlines the psychometric analyses of the empirical study including interrater reliability (Table 1 in Paper 3), test-retest reliability (Table 2 in Paper 3) and internal consistency analysis of the EDS-P and EDS-A (Table 3 and 4 in Paper 3). The correlation matrix for the EDS-P and EDS-A in the empirical study is found in Table 5 in Paper 3. Construct validity was analysed by a comparison of differences between referred and non-referred groups and is found in Table 6 to 9 in Paper 3. This analysis included the preliminary ad hoc sample from Hogrefe Ltd. The results of the analysis of interrater reliability, test-retest reliability and internal consistency revealed a good reliability of the EDS-P. The results of the analyses of internal consistency in Paper 3 showed that the correlation between the EDS-P and the EDS-A was low. This indicates that the scores from the EDS-P and EDS-A do not have similar features, and that they measure different qualities of different constructs. The comparison of similarities and differences between the referred and non-referred groups analysed subgroups of demographic data – gender and age. Table 7a and 7b in Paper 3 revealed a development in emotional competencies between 4–8-year-olds and 9–12- year-olds

in both the non-referred and the referred group, although the development was larger for the non-referred group compared to the referred group, and the result for the limbic score regarding the referred group revealed no significant difference between the two age groups ($p \leq 0.05$). Also, the independent samples t-tests revealed significant differences between referred and non-referred girls for the autonomic and prefrontal scores and the total score (Table 8a in Paper 3). Regarding the limbic score there was no significant difference between referred and non-referred girls ($p \leq 0.05$). Independent samples t-tests revealed significant differences between referred and non-referred boys for all scores and total score with a greater difference in mean than for girls (Table 8b in Paper 3). Independent samples t-tests did not reveal any significant differences between non-referred boys and girls for the autonomic and prefrontal scores and the total score ($p \leq 0.05$) (Table 9a in Paper 3). Among the referred boys and girls, significant but modest differences were revealed on the autonomic score and total score, but not on the limbic and prefrontal scores ($p \leq 0.05$) (Table 9b in Paper 3) (Appendix K).

### 6.2.2 CORRELATION MATRIX FOR THE EDS-A IN THE PRELIMINARY AD HOC SAMPLE FROM HOGREFE LTD.

Because only a few significant and modest correlations between the EDS-P and EDS-A in the empirical study were revealed, an analysis of the preliminary ad hoc sample from Hogrefe Ltd. was included, as the EDS-P and EDS-A were designed to support each other in the clinical setting. This was done to see if there was a difference between a sample consisting exclusively of referred children compared to a sample consisting of 86.4% non-referred children. Below is a correlation matrix for the EDS-P and EDS-A in the preliminary ad hoc sample from Hogrefe Ltd. This analysis revealed significant and modest correlations ($p \leq .01$), in contrast to the empirical study, which only revealed a few significant correlations.

Table 8 Correlation matrix for the EDS-P and EDS-A in the preliminary ad hoc sample from Hogrefe Ltd.

| **EDS-P/EDS-A Cronbach's Alpha (α = .834) n=213** | **EDS-A Autonomic Score** | **EDS-A Limbic Score** | **EDS-A Prefrontal Score** | **EDS-A Total Score** |
|---|---|---|---|---|
| **EDS-P Autonomic score** | .317** | .260** | .347** | .338** |
| **EDS-P Limbic score** | .260** | .288** | .332** | .320** |
| **EDS-P Prefrontal score** | .354** | .327** | .426** | .405** |
| **EDS-P Total score** | .358** | .335** | .427* | .409** |

*< 0.05, ** <0.01, *** < 0.001

### 6.2.3 DIFFERENCE BETWEEN GROUPS OF REFERRED AND NON-REFERRED OF THE EDS-A

In the comparison of similarities and differences between the referred and the non-referred groups in Paper 3, only the EDS-P was analysed, with subgroup analysis from demographic data: gender and age. In comparing groups of non-referred and referred, an independent samples t-test revealed a significant difference between referred and non-referred participants for all scores and total score in the EDS-P (See Table 6 in Paper 3). In comparing the groups of the EDS-A, independent samples t-tests also revealed a significant difference between referred and non-referred participants for all scores and total scores (Table 9).

Table 9: Means and SDs between referred and non-referred in EDS-A

| **EDS-A Referred/non-referred n=248** | **Referred n=64 M** | **SD** | **Non-referred n=184 M** | **SD** | **Test** | **Test Statistics** | ***p*** |
|---|---|---|---|---|---|---|---|
| **Autonomic score** | 44.39 | 7.33 | 55.70 | 7.33 | U* | 910.5 | .000 |
| **Limbic score** | 29.11 | 6.68 | 37.64 | 6.69 | U* | 1.318 | .000 |
| **Prefrontal score** | 37.73 | 8.15 | 50.01 | 8.15 | U* | 1.171 | .000 |
| **EDS-A Total score** | 111.23 | 20.18 | 143.35 | 20.18 | U* | 823 | .000 |

* The assumption was violated through Levine Test. Mann-Whitney test was conducted.

#### 6.2.3.1 Means and Standard Deviations Between Referred 4–8 and 9–12-Year-Olds and Non-Referred 4–8 and 9–12-Year-Olds in the EDS-A

Independent samples t-tests revealed significant differences between non-referred 4–8-year-olds and 9–12-year-olds but no significant differences between referred 4–8-year-olds and 9–12-year-olds (Table 10 and 11).

Table 10: Means and SDs between non-referred age groups in EDS-A

| **EDS-A Non-referred Age groups n=184** | **Mean 4-8 years n=102** | **SD 4-8 years** | **Mean 9-12 years n=82** | **SD 9-12 years** | **Test** | **Test Statistics** | ***p*** |
|---|---|---|---|---|---|---|---|
| **Autonomic score** | 54.72 | 4.45 | 56.93 | 3.33 | U* | 5.638 | .000 |
| **Limbic score** | 37.16 | 3.61 | 38.24 | 2.68 | U* | 4.989 | .000 |
| **Prefrontal score** | 48.70 | 5.65 | 51.65 | 4.53 | U* | 5.659 | .000 |
| **EDS-A Total** | 140.57 | 12.22 | 146.82 | 9.31 | U* | 5.765 | .000 |

* The assumption was violated through Levine Test. Mann-Whitney test was conducted.

Table 11: Means and SDs between referred age groups in EDS-A

| **EDS-A Referred Age groups n=64** | **Mean 4-8 years n=27** | **SD 4-8 years** | **Mean 9-12 years n=37** | **SD 9-12 years** | **Test** | **Test Stats** | ***t*** | ***p*** | **95 % CI** |
|---|---|---|---|---|---|---|---|---|---|
| **Autonomic score** | 45.07 | 8.34 | 43.89 | 8.11 | F(1,62) | 3.100 | .634 | .528 | [-4.91,2.54] |
| **Limbic score** | 30.26 | 6.73 | 28.27 | 6.62 | F(1,62) | .008 | 1.179 | .243 | [-5.36, 1.38] |
| **Prefrontal score** | 38.56 | 8.28 | 37.14 | 8.11 | F(1.62) | .014 | .686 | .496 | [-5.56, 2.72] |
| **EDS-A Total** | 113.89 | 21.91 | 109.30 | 18.89 | F(1.62) | .829 | .898 | .373 | [-14.82, 5.63] |

### 6.2.3.2 Means and Standard Deviations Between Referred and Non-Referred Participants Regarding Age in the EDS-P and EDS-A

In the EDS-A independent samples t-tests revealed significant differences between referred and non-referred 4–8-year-olds. In the EDS-P a significant difference was also revealed, but no significant differences were found on the limbic score (Table 12 and 13).

Table 12: Means and SDs between referred and non-referred aged 4–8 in EDS-P

| **EDS-P Referred/non-referred 4–8-year-olds n=129** | **Referred n=27** | **SD** | **Non-referred n=102** | **SD** | **Test** | **Test Stats** | ***t*** | ***p*** | **95 % CI** |
|---|---|---|---|---|---|---|---|---|---|
| **Autonomic score** | 40.81 | 5.21 | 46.26 | 7.29 | F(1,127) | .364 | 3.642 | .000 | [2.49, 8.41] |
| **Limbic score** | 34.67 | 4.91 | 35.93 | 7.02 | F(1,127) | .639 | .879 | .381 | [2.97, 7.92] |
| **Prefrontal score** | 74.78 | 13.09 | 92.63 | 17.22 | F(1,127) | 1.40 | 5.011 | .000 | [-1.58,4.11] |
| **EDS-P Total** | 150.04 | 19.11 | 174.82 | 28.60 | F(1,127) | 1.01 | 4.252 | .000 | [10.80,24.90 ] |

Table 13: Means and SDs between referred and non-referred aged 4–8 in EDS-A

| **EDS-A Referred/non-referred 4–8-years-olds n=129** | **Referred n=27 M** | **SD** | **Non-referred n=102 M** | **SD** | **Test** | **Test Stat** | ***p*** |
|---|---|---|---|---|---|---|---|
| **Autonomic score** | 45.07 | 8.34 | 54.72 | 4.45 | U* | 365.5 | .000 |
| **Limbic score** | 30.26 | 6.73 | 37.16 | 3.61 | U* | 451.0 | .000 |
| **Prefrontal score** | 38.56 | 8.28 | 48.70 | 5.65 | U* | 414.0 | .000 |
| **EDS-A Total** | 113.89 | 21.91 | 140.57 | 12.22 | U* | 331.5 | .000 |

* The assumption was violated through Levine Test. Mann-Whitney test was conducted.

Regarding the 9–12-year-olds, independent t-test revealed significant differences between non-referred and referred participants (Table 14 and 15).

Table 14: Means and SDs between referred and non-referred aged 9–12 in EDS-P

| **EDS-P Referred/non-referred 9–12-year-olds n=119** | **Referred n=37** | **SD** | **Non-referred n=82** | **SD** | **Test** | **Test Stat** | ***t*** | ***p*** | **95 % CI** |
|---|---|---|---|---|---|---|---|---|---|
| **Autonomic score** | 44.65 | 6.06 | 50.02 | 6.17 | U* | 501.5 | | .000 | |
| **Limbic score** | 36.68 | 7.76 | 41.30 | 6.01 | U* | 885.0 | | .000 | |
| **Prefrontal score** | 87.89 | 14.32 | 103.46 | 13.44 | F(1,117) | 2.226 | 5.73 | .000 | [10.01, 21.13] |
| **EDS-P Total** | 169.22 | 25.35 | 194.79 | 22.56 | U* | 550.0 | | .000 | |

* The assumption was violated through Levine Test. Mann-Whitney test was conducted.

Table 15: Means and SDs between referred and non-referred aged 9–12 in EDS-A

| **EDS-A Referred/non-referred 9–12-year-olds n=119** | **Referred n=37 M** | **SD** | **Non-referred n=82 M** | **SD** | **Test** | **Test Stat** | ***p*** |
|---|---|---|---|---|---|---|---|
| **Autonomic score** | 43.89 | 6.57 | 56.93 | 3.33 | U* | 112.0 | .000 |
| **Limbic score** | 28.27 | 6.62 | 38.24 | 2.68 | U* | 214.5 | .000 |
| **Prefrontal score** | 37.14 | 8.11 | 51.65 | 4.53 | U* | 147.5 | .000 |
| **EDS-A Total** | 109.30 | 18.89 | 146.82 | 9.31 | U* | 112.0 | .000 |

* The assumption was violated through Levine Test. Mann-Whitney test was conducted.

Table 16: Differences between referred and non-referred regarding age in EDS-P

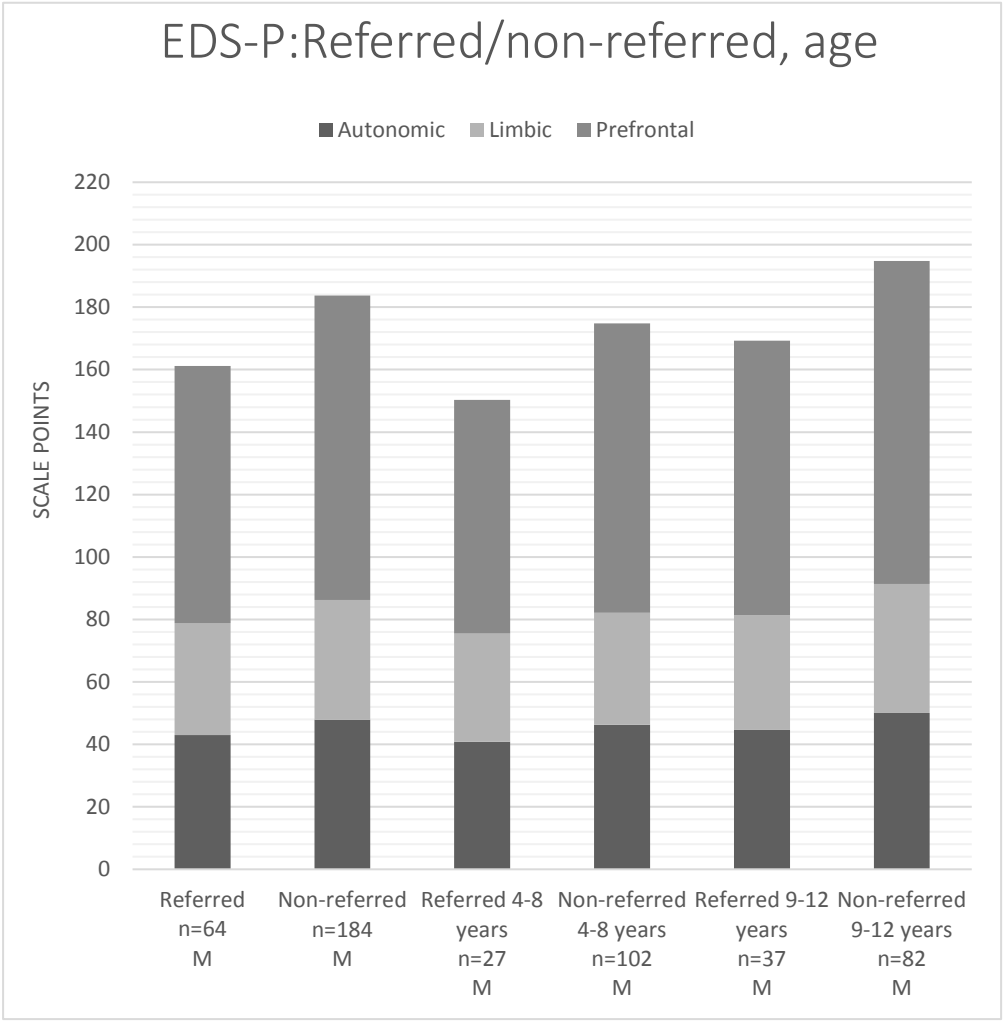
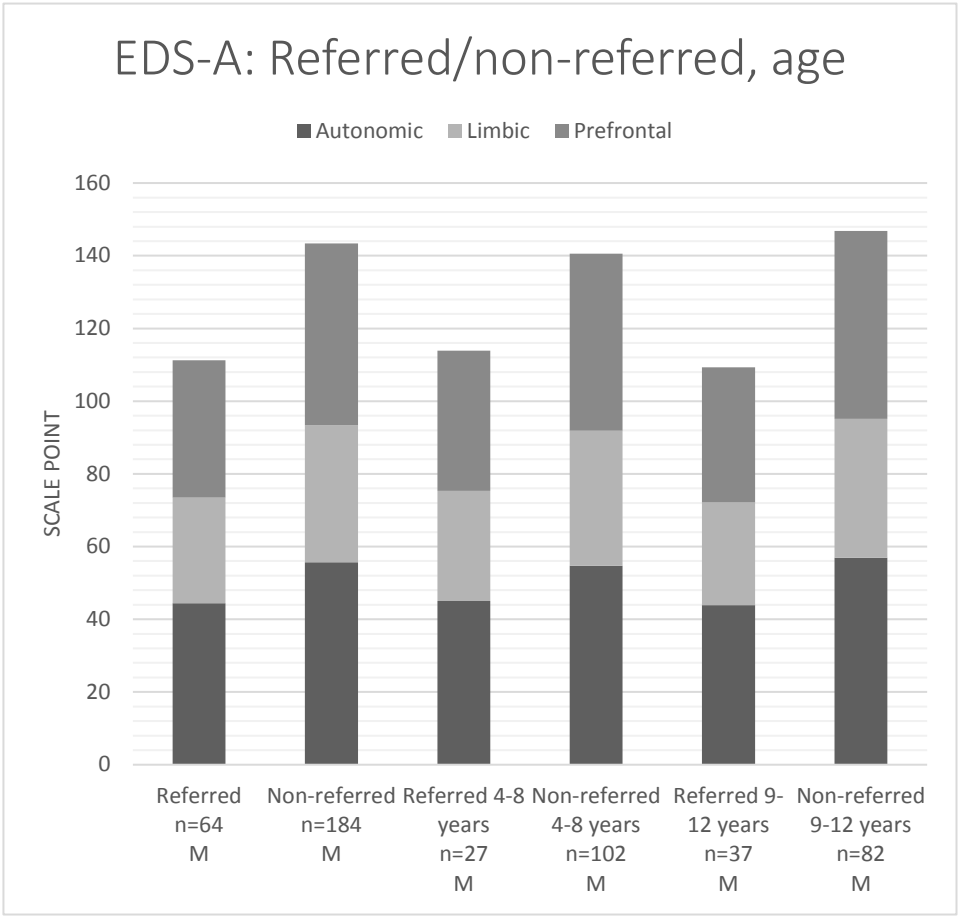


Table 17: Differences between referred and non-referred regarding age in EDS-A




### 6.2.3.3 Means and Standard Deviations Between Referred and Non-Referred Participants Regarding Gender

Independent samples t-tests revealed significant differences between referred and non-referred girls and boys in terms of scores on the autonomic, prefrontal and total levels on the EDS-A (Table 18), as seen on the EDS-P (Paper 3, Table 8).

Table 18: Means and SDs between referred and non-referred regarding girls

| **EDS-A Referred/non-referred Girls n=113** | **Referred n=34 M** | **SD** | **Non-referred n=79** | **SD** | **Test** | **Test Stat** | ***p*** |
|---|---|---|---|---|---|---|---|
| **Autonomic score** | 45.59 | 6.40 | 55.25 | 4.52 | U* | 284.5 | .000 |
| **Limbic score** | 29.97 | 6.69 | 37.22 | 3.77 | U* | 407.5 | .000 |
| **Prefrontal score** | 39.09 | 7.84 | 49.43 | 6.15 | U* | 367.0 | .000 |
| **EDS-A Total** | 114.65 | 18.32 | 141.90 | 13.29 | U* | 267.0 | .000 |

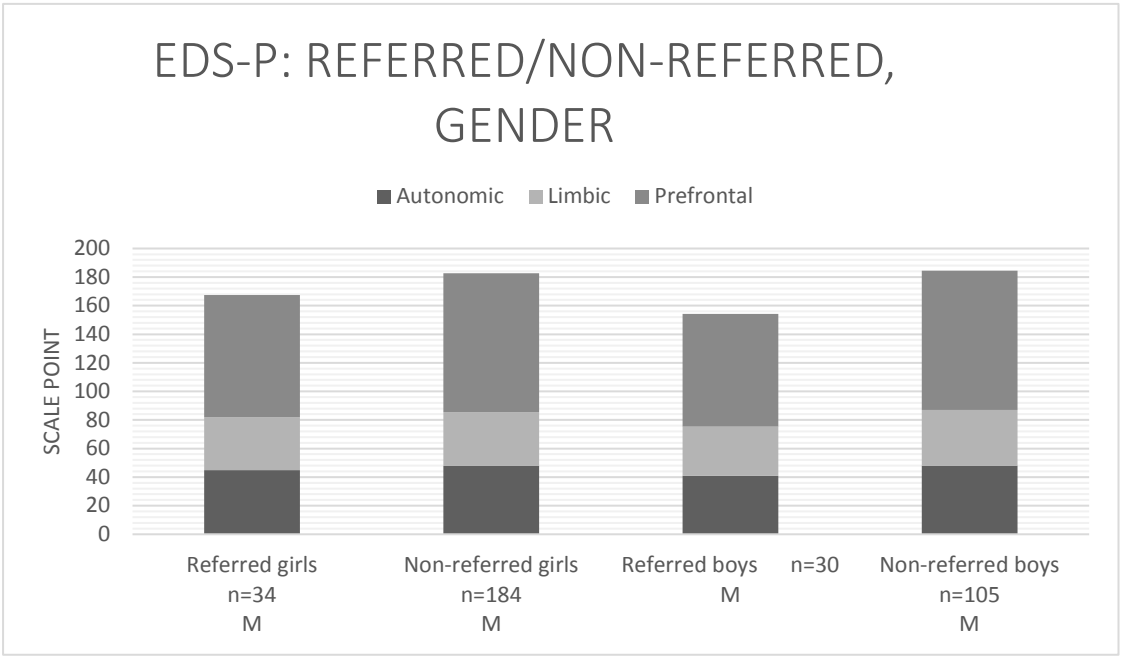
* The assumption was violated through Levine Test. Mann-Whitney test was conducted.

Table 19: Means and SDs between referred and non-referred regarding boys

| **EDS-A Referred/non-referred Boys n=135** | **Referred n=30 M** | **SD** | **Non-referred n=105** | **SD** | **Test** | **Test Stat** | ***p*** |
|---|---|---|---|---|---|---|---|
| **Autonomic score** | 43,03 | 8.16 | 56,04 | 3.80 | U* | 167.5 | .000 |
| **Limbic score** | 28.13 | 6.66 | 37.96 | 2.80 | U* | 251.5 | .000 |
| **Prefrontal score** | 36.20 | 8.36 | 50.45 | 4.69 | U* | 222.5 | .000 |
| **EDS-A Total** | 107.37 | 21.76 | 144.45 | 9.71 | U* | 145.5 | .000 |

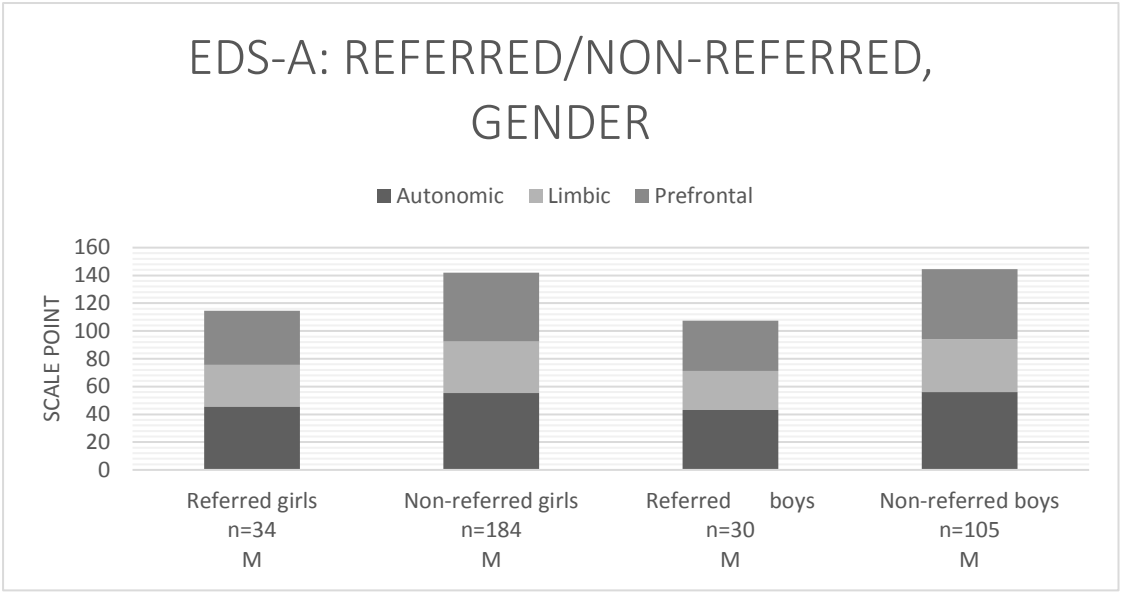
* The assumption was violated through Levine Test. Mann-Whitney test was conducted.

Table 20: Differences between referred and non-referred regarding gender in EDS-P




(See Paper 3, Table 8a, 8b)

Table 21: Differences between referred and non-referred regarding gender in EDS-A



### 6.2.3.4 Means and Standard Deviations Between Groups Regarding Boys and Girls on the EDS-A

Independent samples t-tests revealed no significant differences for the EDS-A regarding differences between groups of girls and boys nor between referred and non-referred groups ($p \leq 0.05$) (Table 22 and 23).

Table 22: Means and SDs between referred boys and girls

| **EDS-A Referred Gender N=64** | **Mean Boys n=30** | **SD Boys** | **Mean Girls n=34** | **SD Girls** | **Test** | **Test Stat** | ***t*** | ***p*** | **95 % CI** |
|---|---|---|---|---|---|---|---|---|---|
| **Autonomic score** | 43.03 | 8.16 | 45.59 | 6.40 | F(1,62) | 3.100 | 1.402 | .166 | [-4,91, 2.54] |
| **Limbic score** | 28.13 | 6.66 | 29.97 | 6.69 | F(1,62) | .008 | 1.098 | .276 | [-5,36, 1.38] |
| **Prefrontal score** | 36.20 | 8.36 | 39.09 | 7.84 | F(1,62) | .014 | 1.426 | .159 | [-5,56, 2.72] |
| **EDS-A Total** | 107.37 | 21.76 | 114.65 | 18.32 | F(1,62) | .829 | 1.453 | .151 | [-14,82, 5.63] |

Table 23: Means and SDs between non-referred boys and girls

| **EDS-A Non-referred Gender N=184** | **Mean Boys n=105** | **SD Boys** | **Mean Girls n=79** | **SD Girls** | **Test** | **Test Stat** | ***t*** | ***p*** | **95 % CI** |
|---|---|---|---|---|---|---|---|---|---|
| **Autonomic score** | 56.04 | 3.80 | 55.25 | 4.52 | F(1,182) | 2.858 | 1.297 | .203 | [-,43, 2.00] |
| **Limbic score** | 37.97 | 2.80 | 37.22 | 3.77 | F(1.182) | 2.887 | 1.540 | .125 | [-,21, 1.70] |
| **Prefrontal score** | 50.45 | 4.69 | 49.43 | 6.15 | F(1,182) | 3.736 | 1.273 | .204 | [-,56, 2.59] |
| **EDS-A Total** | 144.45 | 9.71 | 141.90 | 13.29 | U** | 3.759 | | | |

* The assumption was violated through Levine Test. Mann-Whitney test was conducted.

** Retain the null hypothesis

## 6.3 PREDICTIVE VALIDITY

To be able to answer the hypothesis of the progression of the autonomic, limbic and prefrontal scores on both the EDS-P and EDS-A, an analysis of indicated progression

was conducted by calculating the mean based on a percentage of max scores from both the empirical study sample and the sample from Hogrefe Ltd. The statistical analysis was conducted by finding the mean in percentage of the autonomic, limbic and prefrontal scores, enabling a correlational analysis of the three score levels. The scores were analysed across age and age groups: 4–8-year-olds and 9–12-year-olds and across gender.

Calculation for each score: $\frac{\text{Mean} \times 100}{\text{Max score}}$

The results of merging the two samples revealed a progression between autonomic and prefrontal levels, but the limbic level on both the EDS-P and the EDS-A showed an unclear progression for all age groups and both genders. On the EDS-A, the levels were more equal than on the EDS-P. Table 24 shows the progression of mean based on percentage of max scores for 4–12-year-olds, 4–8-year-olds, 9–12-year-olds and boys and girls for the merged samples.

Table 24: Indicated progression from the empirical study and the preliminary ad hoc sample from Hogrefe Ltd.

| **EDS-P/EDS-A**<br><br>**Empirical study/Hogrefe sample** | **Mean score derived from max scores: 4-12 years n=248** | **Mean score derived from max scores: 4–8-year-olds n=129** | **Mean score derived from max scores: 9–12-year-olds n=119** | **Mean score derived from max scores: boys n=135** | **Mean score derived from max scores: girls n=113** |
|---|---|---|---|---|---|
| **EDS-P** | | | | | |
| **Autonomic** | 89.76 | 86.77 | 92.99 | 89.44 | 90.13 |
| **Limbic** | 78.50 | 74.31 | 83.05 | 78.89 | 78.04 |
| **Prefrontal** | 80.66 | 76.63 | 85.02 | 80.50 | 80.84 |
| **EDS-A** | | | | | |
| **Autonomic** | 87.97 | 87.83 | 88.12 | 88.58 | 87.24 |
| **Limbic** | 88.60 | 89.28 | 87.86 | 89.44 | 87.59 |
| **Prefrontal** | 83.65 | 83.17 | 84.17 | 84.43 | 82.71 |

Because the progression of the merged sample did not show a clear progression as expected, due to unclear results for the limbic level, an investigation of progression between referred and non-referred groups was conducted. Tables 25, and the bar charts displayed in Table 27 and 28 show the progression of mean based on percentage of max scores for 4–12-year-olds, 4–8-year-olds, 9–12-year-olds and boys and girls for the referred group. As seen in the tables and bar charts, there is a clear indication of progression on the EDS-P for the referred group for all age groups and both genders, as the mean autonomic level is higher than the mean limbic level, which in turn is higher than the mean prefrontal level. On the EDS-A, there is also a progression for the mean on the autonomic, limbic and prefrontal levels, except for 4–8-year-olds on the limbic level, but here, the autonomic and limbic levels are close to equal.

Table 25: Indicated progression from merged sample of referred participants

| **EDS-P/EDS-A**<br><br>**Referred** | **Mean score derived from max scores: 4–12 years n=64** | **Mean score derived from max scores: 4–8-year-olds n=27** | **Mean score derived from max scores: 9–12-year-olds n=37** | **Mean score derived from max scores: boys n=30** | **Mean score derived from max scores: girls n=34** |
|---|---|---|---|---|---|
| **EDS-P** | | | | | |
| **Autonomic** | 82.75 | 78.49 | 85.86 | 78.78 | 86.26 |
| **Limbic** | 74.64 | 72.22 | 76.41 | 71.74 | 77.21 |
| **Prefrontal** | 71.00 | 64.46 | 75.77 | 67.90 | 73.73 |
| **EDS-A** | | | | | |
| **Autonomic** | 73.98 | 75.12 | 73.15 | 71.72 | 75.98 |
| **Limbic** | 72.77 | 75.65 | 70.68 | 70.33 | 74.93 |
| **Prefrontal** | 67.38 | 68.85 | 66.31 | 64.64 | 69.80 |

Unexpectedly, the same clarity of progression that was found in the referred group was not found for the non-referred group due to a low limbic level on the EDS-P and a high limbic level on the EDS-A. Scores on the autonomic and prefrontal levels are well balanced with a clear progression on the two levels of both the EDS-P and the EDS-A. Table 26 and the bar charts displayed in Tables 29 and 30 show the progression of mean based on percentage of max scores for 4–12-year-olds, 4–8-year-olds, 9–12-year-olds and boys and girls. As the autonomic mean level is considerably higher than both the limbic and prefrontal mean levels for all age groups and both genders, some progression was also found in the non-referred group on both the EDS-P and the EDS-A.

Table 26: Indicated progression from preliminary ad hoc sample from Hogrefe Ltd. of non-referred participants

| **EDS-P/EDS-A**<br><br>**Non-referred** | **Mean score derived from max scores: 4–12-year-olds n=184** | **Mean score derived from max scores: 4-8-year-olds n=102** | **Mean score derived from max scores: 9–12-year-olds N=82** | **Mean score derived from max scores: boys n=105** | **Mean score derived from max scores: girls n=79** |
|---|---|---|---|---|---|
| **EDS-P** | | | | | |
| **Autonomic** | 92.19 | 88.97 | 96.20 | 92.49 | 91.80 |
| **Limbic** | 79.85 | 74.85 | 86.05 | 80.93 | 78.40 |
| **Prefrontal** | 84.01 | 79.85 | 89.19 | 84.10 | 83.90 |
| **EDS-A** | | | | | |
| **Autonomic** | 92.84 | 91.19 | 94.87 | 93.40 | 92.09 |
| **Limbic** | 94.10 | 92.89 | 95.61 | 94.90 | 93.04 |
| **Prefrontal** | 89.31 | 86.96 | 92.23 | 90.09 | 88.27 |

To make an overview of the progression regarding EDS-P and EDS-A a bar chart of the progression of the referred group and non-referred group are shown in table 27-30.

Table 27: Progression on the EDS-P from merged sample of referred participants

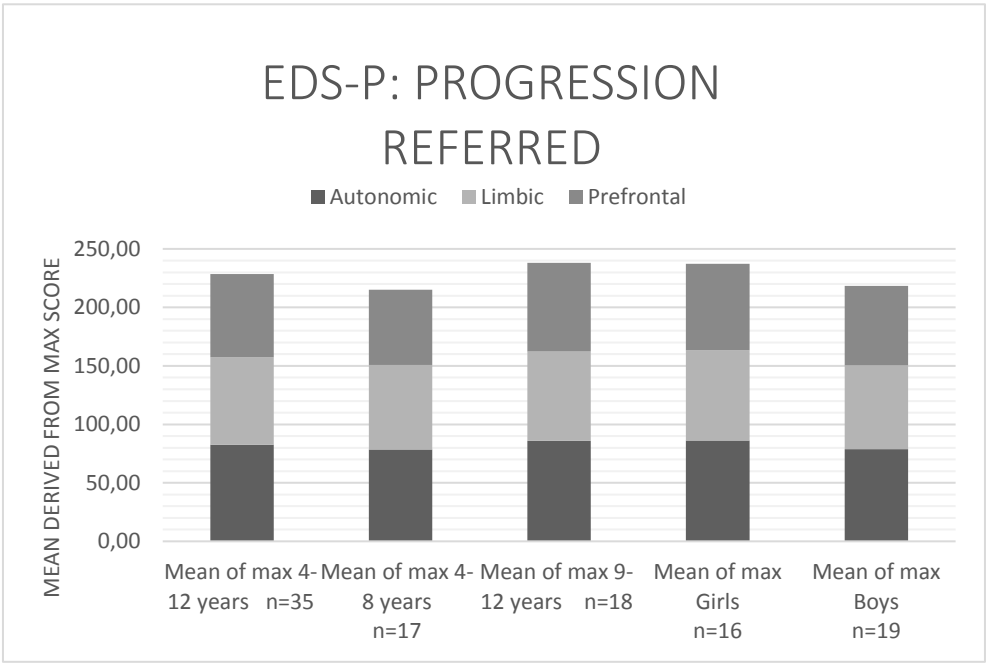



Table 28: Progression on the EDS-P from merged sample of referred participants

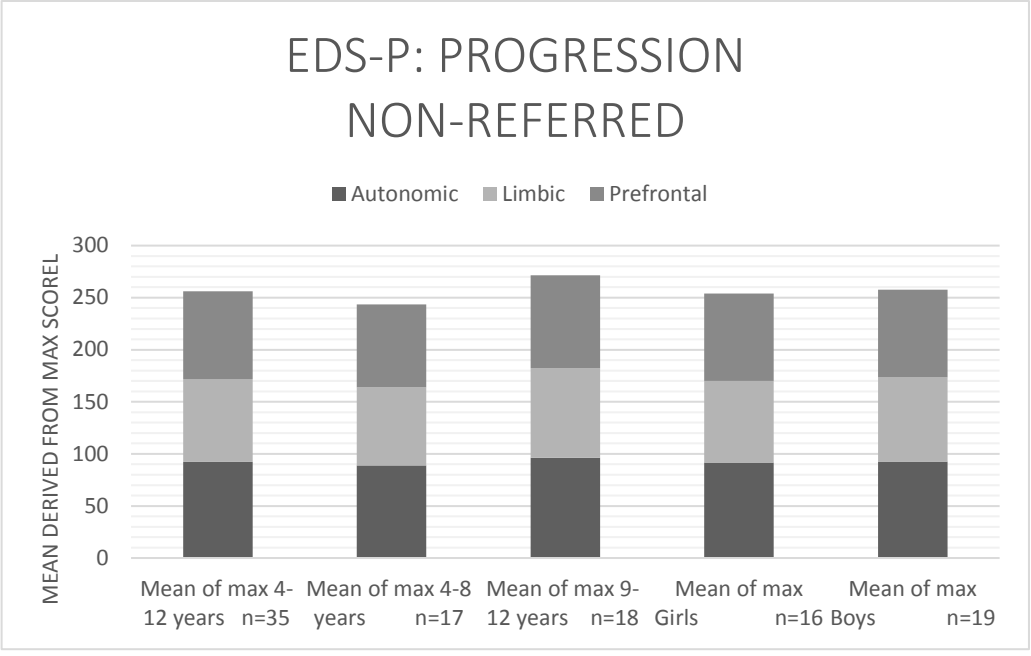


Table 29: Progression on the EDS-P from Hogrefe Ltd. sample of non-referred

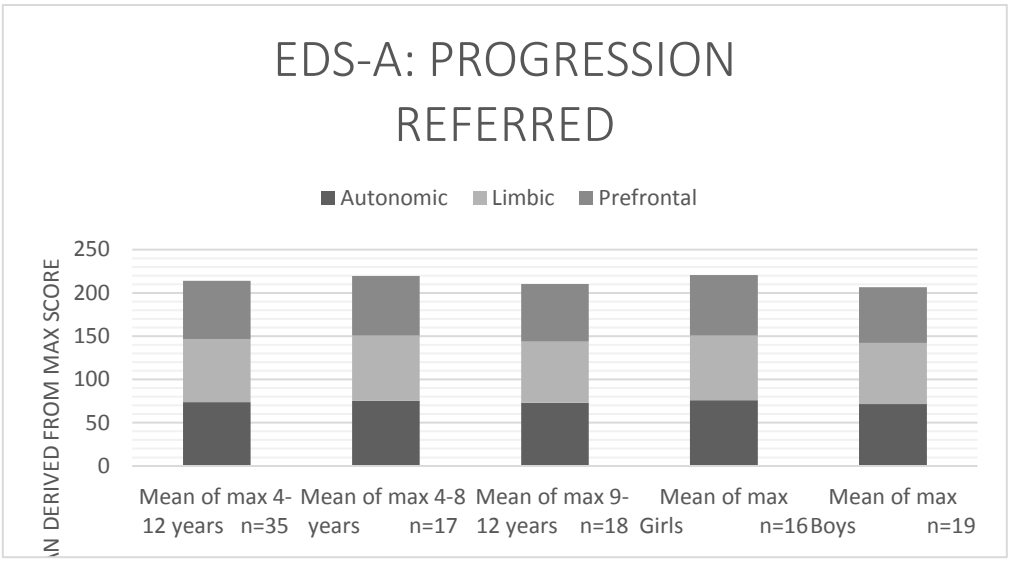
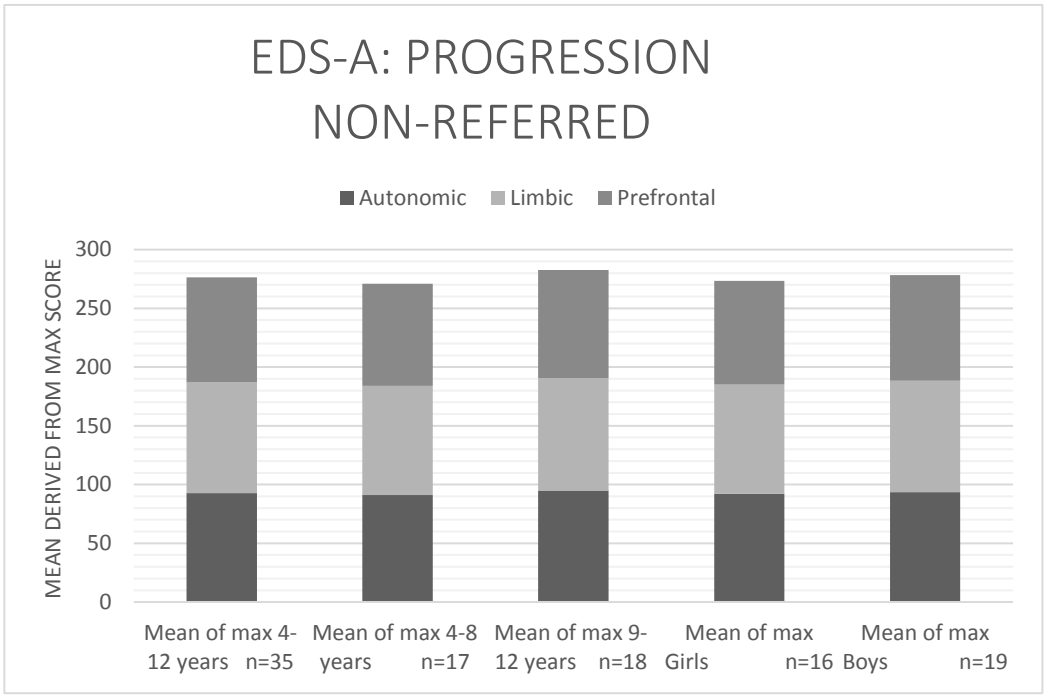



Table 30: Progression on the EDS-A from Hogrefe Ltd. sample of non-referred participants



### 6.3.1 COMPARING DIFFERENCES OF THE EDS-P AND THE EDS-A FROM MAX SCORES DERIVED FROM MEAN

Because the max of the mean score was calculated, it is possible to provide an estimate for the difference between the results from the EDS-A and the EDS-P in both the referred and the non-referred group (Table 31). The minus sign shows that results of EDS-A are negatively biased compared to the EDS-P, while a number that is not preceded by a minus sign indicates that the EDS-A is positively biased compared to the EDS-P.

The average difference within the referred group shows that the mean of scores regarding EDS-A is lower than the EDS-P except for the 4–8-years-olds on the limbic and prefrontal levels. In the non-referred group, the mean of scores regarding EDS-A is higher except for the 9–12-year-olds on the autonomic level. On the limbic level in the non-referred group the mean difference between EDS-A and EDS-P is quite substantial and regarding the autonomic level only minor differences is revealed, which will be discussed in Chapter 7.

Table 31: Differences between the EDS-A and the EDS-P mean scores of referred and non-referred

| **Differences between EDS-A and EDS-P mean scores of referred and non-referred** | **Difference in mean score derived from max scores: 4–12-year-olds n=248** | **Difference in mean score derived from max scores: 4–8-year-olds n=129** | **Difference in mean score derived from max scores: 9–12-year-olds n=119** | **Difference in mean score derived from max scores: boys n=135** | **Difference in mean score derived from max scores: girls n=113** |
|---|---|---|---|---|---|
| **Referred** | | | | | |
| **Autonomic** | –8.77 | –3.36 | –12.71 | –7.06 | –10.28 |
| **Limbic** | –1.87 | 3.43 | –5.73 | –1.41 | –2.28 |
| **Prefrontal** | –3.62 | 4.39 | –9.46 | –3.26 | –3.93 |
| **Non-referred** | | | | | |
| **Autonomic** | 0.65 | 2.22 | –1.32 | 0.45 | 0.29 |
| **Limbic** | 14.25 | 18.04 | 9.57 | 13.02 | 14.64 |
| **Prefrontal** | 5.31 | 7.11 | 3.04 | 5.45 | 4.37 |

## 6.4 CONSTRUCT VALIDITY

The next part of the chapter presents construct validity analysis for correlations between the EDS and NMI, MIM-P and the standardized questionnaires PSI and PCRI.

### 6.4.1 EDS-P, EDS-A AND PSI

Pearson's correlation coefficients showed significant, but modest correlations between EDS-P scores and some subscales from PSI regarding the child domain in the expected direction, as low scores on the PSI indicate lower levels of stress. Correlations are shown in Table 32 and 33. Pearson correlation coefficients ranged from .343 to .523 on significant correlations indicating that the tests seem to have similar features but measure different qualities. Especially for the EDS-A, several significant and modest correlations were found. On the autonomic score, significant moderate correlations were found between the parent's understanding of the child's capacity to regulate arousal and synchronize and the parent's understanding of the child's adaptability (.456, $p < 0.01$), acceptability (.439, $p < 0.01$) and total functioning (.343, $p < .05$). Regarding the limbic score, significant modest correlations were found between the parent's understanding of the child's regulation of emotions and the child's adaptability (.513, $p < 0.01$) and acceptability (.411, $p < 0.05$) and total functioning (.379, $p < 0.05$). On the prefrontal level, there were significant moderate correlations between the parent's understanding of the child's impulse regulation and mentalizing capacity and the domains of the child's distractibility (.401, $p < 0.05$), adaptability (.504, $p < 0.01$), acceptability (.503, $p < 0.01$) and total functioning. (.424, $p < 0.05$). In the total scores (sum of autonomic, limbic and prefrontal score) on the EDS-A there were significant moderate correlations between the parent's understanding of the child's adaptability (.523, $p < 0.01$) and acceptability (.491, $p < 0.01$) and in the total scores on the child domain of the PSI (.416, $p < 0.05$). Regarding EDS-P, only significant modest correlation was found between the child's performance on the autonomic level and the parent's understanding of the child's adaptability (.449, $p < 0.01$). No correlations were found between EDS-P on the limbic and prefrontal levels and the PSI.

Table 32: Correlations between EDS and PSI, Child Domain

| PSI Child Domain | EDS-P Autonomic score | EDS-A Autonomic score | EDS-A Limbic score | EDS-A Prefrontal score | EDS-A Total Score |
|---|---|---|---|---|---|
| **Distractibility** | .110 | .127 | .253 | -.401* | .069 |
| **Adaptability** | -.449** | -.456** | -.513** | -.504** | -.523** |
| **Acceptability** | -.082 | -.439** | -.411* | -.503** | -.491** |
| **Total** | -271 | -.343* | -.379* | -.424* | -.416* |

*< 0.05, ** <0.01, *** < 0.001

Regarding the Parent Domain of the PSI, the EDS-P and EDS-A only revealed a few significant modest correlations. However, between the PSI and EDS-P, significant moderate correlations were found on the limbic level and within the score regarding support from spouse (.348, $p < 0.05$) and on the prefrontal level regarding the depression score (.339, $p < 0.05$). Between the PSI and the EDS-A, on the autonomic level, significant moderate correlations were found within the score of support from spouse (.411, $p < 0.05$) and for the total scores of the EDS-A (.352, $p < 0.05$). See

Table 33: Correlations between EDS and PSI, Parent Domain

| PSI Parent Domain | EDS-P Limbic | EDS-P Prefrontal | EDS-P Total | EDS-A Autonomic | EDS-A Total |
|---|---|---|---|---|---|
| **Depression** | .342 | .339* | .334* | .194 | .194 |
| **Spouse** | .348* | .179 | .235 | .411* | .352* |

*< 0.05, ** <0.01, *** < 0.001

### 6.4.2 CONSTRUCT VALIDITY: EDS-P, EDS-A AND PCRI

Pearson's correlation coefficients showed only a few significant correlations between EDS scores and all subscales from Parent-Child-Relationship Inventory in an unexpected direction, which will be discussed in Chapter 7. Correlation coefficients are shown in Table 34. Significant correlations ranged from -.343 to -.397, indicating that the tests seem to have similar features, but they measure different qualities ad are reversed according to the expectations. There was a significant modest negative correlation between the EDS-P on the limbic level and the dimension of parental support (-.343, $p < 0.05$) and the dimension of limit setting (-.397, $p < 0.05$). Between the PCRI and the EDS-A, on the prefrontal level, significant modest negative correlations were found between the domains of parental satisfaction (-.343, $p < 0.05$) and involvement in their child (-.354, $p < 0.05$).

Table 34: Correlations between EDS and PCRI

| EDS-P/PCRI | EDS-P Limbic | EDS-A Prefrontal |
|---|---|---|
| **Parental Support** | -.343* | -.300 |
| **Parental Satisfaction** | -.226 | -.343* |
| **Involvement** | -.212 | -.354* |
| **Limit Setting** | -.397* | -.212 |

*< 0.05, ** <0.01, *** < 0.001

### 6.4.3 CONSTRUCT VALIDITY: EDS-P, EDS-A AND NMI

No correlations and no significance were found between the EDS-P, EDS-A and NMI in the sample from the empirical study. This will be further discussed in Chapter 7.

### 6.4.4 CONSTRUCT VALIDITY: EDS-P, EDS-A AND MIM-P

Pearson's correlation coefficients showed a significant and modest correlation between a few MIM-P and EDS-A scores. In the empirical study no correlations were found between the MIM-P and EDS-P. There was a significant, modest correlation between the child's acceptance of being nurtured and giving nurture on all levels in

the EDS-A (autonomic: .357, $p < 0.05$; limbic: .520, $p < 0.01$; prefrontal: .394, $p < 0.05$; total: .445, $p < 0.01$). Also, the child's engagement in the interaction with the parent correlates with the total score of EDS-A (.365, $p < 0.05$) (Table 35).

Table 35: Correlations between EDS and MIM-P

| EDS-A/MIM-P | EDS-A Autonomic | EDS-A Limbic | EDS-A Prefrontal | EDS-A Total |
|---|---|---|---|---|
| **Engagement Child** | .310 | .432* | .326 | .365* |
| **Nurture Child** | .357* | .520** | .394* | .445** |
| **Total Child** | .258 | .391* | .293 | .324 |

*< 0.05, ** <0.01, *** < 0.001

In order to further analyse construct validity, the population of the empirical study was divided into groups of 4–8-year-olds, 9–12-year-olds and boys and girls to enable further correlation analyses between these groups.

*Regarding Age*

Pearson's correlation coefficients showed significant and modest correlations between MIM-P and EDS scores for 4–8-year-olds in an expected direction. There was a significant, modest correlation between the EDS-P on the autonomic level and the child structure dimension (.600, $p < 0.05$), child relational structure dimension (.613, $p < 0.01$), child nurture dimension (.556, $p < 0.05$), and the total MIM-P score for the child (.617, $p < 0.01$). There was a significant, modest correlation between the EDS-P on the limbic level and child relational structure dimension (.501, $p < 0.05$) and child nurture dimension (.493, $p < 0.05$). There was significant, modest correlation between the EDS-P on total scores and child relational structure (.524, $p < 0.05$), child engagement structure (.491, $p < 0.05$), child nurture dimension (.553, $p < 0.05$), interaction nurture dimension (.488, $p < 0.05$) and the total score child in the MIM-P (.525, $p < 0.05$). The correlation between the MIM-P and the EDS-A was significant and modest on the prefrontal level and child engagement dimension (.486, $p < 0.05$) and the EDS-A total score and child engagement dimension (.489, $p < 0.01$) (Table 36).

Table 36: Correlations between EDS and MIM-P for 4–8-year-olds

| EDS/MIM-P 4–8-year-olds N=17 | EDS-P Autonomic | EDS-P Prefrontal | EDS-P Total | EDS-A Prefrontal | EDS-A Total |
|---|---|---|---|---|---|
| **Structure Child** | .600* | .406 | .443 | .238 | .250 |
| **Relational Child** | .613** | .501* | .524* | .298 | .318 |
| **Engagement Child** | .479 | .441 | .491* | .486* | .489* |
| **Nurture Child** | .556* | .493* | .553* | .465 | .475 |
| **Nurture Interaction** | .405 | .439 | .488* | .020 | .040 |
| **Total Child** | .617** | .473 | .525* | .391 | .393 |

*< 0.05, ** <0.01, *** < 0.001

Pearson's correlation coefficients showed significant and modest correlations between MIM-P and EDS scores for 9–12-year-olds. There was a significant, modest correlation between the EDS-P on the limbic level and child engagement dimension (.503, $p < 0.05$) and child challenge dimension (.516, $p < 0.05$). On the prefrontal level there was a significant modest correlation on the child challenge dimension (.516, $p < 0.05$) and on the total score, a correlation with the child challenge dimension (.506, $p < 0.05$). The correlation between the EDS-A and the MIM-P solely correlated on the limbic level of the child nurture dimension (.540, $p < 0.05$) and the interaction nurture dimension (.487, $p < 0.05$) (Table 37).

Table 37: Correlations between EDS and MIM-P for 9–12-year-olds

| EDS/MIM-P 9–12-year-olds N=18 | EDS-P Limbic | EDS-P Prefrontal | EDS-P Total | EDS-A Limbic |
|---|---|---|---|---|
| **Engagement Child** | .503* | .395 | .408 | .313 |
| **Nurture Child** | .376 | .191 | .222 | .540* |
| **Nurture Interaction** | .266 | .122 | .126 | .487* |
| **Challenge Child** | .516* | .516* | .506* | .315 |

*< 0.05, ** <0.01, *** < 0.001

*Regarding Gender*

Pearson's correlation coefficients showed several significant and modest correlations between MIM-P and EDS scores in the boy group. There was a significant, unexpected modest negative correlation between the EDS-P on the autonomic level and the parent structure dimension (-.544, $p < 0.05$) and the total score for the parent (-.460, $p < 0.05$). Further, the total score of the EDS-P correlated negatively with the parent structure dimension (-.495, $p < 0.01$). The negative correlation will be discussed in Chapter 7. Regarding EDS-A, there was a significant, strong correlation between the limbic level and the child engagement dimension (.722, $p < 0.001$), and significant modest correlations between the limbic level and the child nurture dimension (.661, $p < 0.05$) and the child total score of the MIM-P (.590, $p < 0.01$).

Further, on the prefrontal level there was a significant modest correlation with the child relational structure dimension (.561, $p < 0.05$), and between the total score of the EDS-A and the child engagement dimension (.529, $p < 0.05$, 2-tailed) and nurture dimension (.468, $p < 0.05$) (Table 38).

No correlations were found between the EDS-P/ EDS-A and MIM-P in the girl group.

Table 38: Correlations between EDS and MIM-P for boys

| **EDS/MIM-P Boys N=19** | **EDS-P Autonomic** | **EDS-P Total** | **EDS-A Limbic** | **EDS-A Prefrontal** | **EDS-A Total** |
|---|---|---|---|---|---|
| **Structure Parent** | –.544* | –.495* | .157 | –.182 | –.089 |
| **Relational Child** | .016 | –.132 | .240 | .561* | .355 |
| **Engagement Child** | .130 | .038 | .722*** | .421 | .529* |
| **Nurture Child** | .109 | .043 | .661* | .363 | .468* |
| **Total Parent** | –.460* | -.410 | .228 | -.139 | –.027 |
| **Total Child** | ,022 | -.119 | .590** | .281 | .383 |

*< 0.05, ** <0.01, *** < 0.001

## 6.5 CONSTRUCT VALIDITY: MIM-P AND NMI

All though the results of the construct validity between the MIM-P and NMI is out of the scope of the dissertation they are included, because Pearson's correlation coefficients showed significant and modest correlations between MIM-P and NMI scores, and they are relevant for the understanding of the connection between the child's emotional development, the parent's mentalizing capacity and the intersubjectivity between the parent and child. This is further discussed in Chapter 7. There was a significant, modest correlation between the NMI section A and MIM-P parent relational structure dimension (.343, $p < 0.05$), parent nurture dimension (.350, $p < 0.05$), interaction nurture dimension (.336, $p < 0.05$), parent challenge dimension (.414, $p < 0.05$) and interaction challenge dimension (.368, $p < 0.05$). Regarding the NMI, section C, only one significant modest correlation was found, which was the parent nurture dimension (.377, $p < 0.05$). Regarding the NMI, section B, and the total scores (sum of A, B and C) of the NMI, a very large number of similar significant modest correlations were found, all of which had to do with parent and interaction dimensions. The following correlations were found: parent relational structure dimension (.407–.445, $p < 0.05$), parent engagement dimension (.343–.359, $p < 0.05$), parent nurture dimension (.425–.440, $p < 0.05$), interaction nurture dimension (407–.429, $p < 0.05$), parent challenge dimension (.429–.449, $p < 0.05$), and interaction challenge dimension (.436–.439, $p < 0.05$). There was a significant modest correlation between the total score of interaction in the MIM-P with the NMI, section B (.368-.421, $p < 0.05$) (Table 39).

Table 39: Correlations between NMI and MIM-P

| NMI/MIM-P | NMI A | NMI B | NMI C | NMI Total |
|---|---|---|---|---|
| **Structure Interaction** | .135 | .421* | –.075 | .345* |
| **Relational Parent** | .343* | .445** | .273 | .407* |
| **Relational Interaction** | .271 | .384* | .178 | .323 |
| **Engagement Parent** | .319 | .359* | .212 | .343* |
| **Nurture Parent** | .350* | .425* | .377* | .440** |
| **Nurture Interaction** | .336* | .407* | .318 | .429* |
| **Challenge Parent** | .414* | .449** | .257 | .429* |
| **Challenge Interaction** | .368* | .436** | .212 | .439** |
| **Total Interaction** | .374 | .421* | .210 | .368* |

*< 0.05, ** <0.01, *** < 0.001

## 6.6 SUMMARY

The results of the analyses of interrater reliability, test-retest reliability and internal consistency revealed good reliability of the EDS-P. The internal consistency of the EDS-A was also found to be good. No significant correlations between the EDS-P and EDS-A were revealed in the empirical study, but in the preliminary ad hoc sample from Hogrefe Ltd. the correlation between the EDS-P and the EDS-A revealed significant and modest correlation. In comparing the two groups of referred and non-referred participants in the EDS, significant differences between referred and non-referred participants were revealed regarding all scores and total scores between both age and gender. There was an indication of progression on the EDS-P, and modest but significant correlations were found in the external validity study.

# CHAPTER 7: DISCUSSION

## 7.1 SUMMARY AND DISCUSSION OF RESULTS

Chapter 7 begins with a short summary of the main findings and a discussion of the results of the literature review. The next part of the chapter regards the empirical study in light of the research questions, which relate to the NADP understanding, referred to in Chapter 2. The chapter includes a discussion of the limitations of the study and recommendations for further research. Finally, it addresses recommendations for the clinical applicability of both the EDS and the main findings of the study. The chapter answers the hypotheses presented in Chapter 5.

## 7.2 SUMMARY OF MAIN FINDINGS

This research project introduced a potentially useful newly developed measurement tool, the Emotional Development Scale (EDS), which is designed for screening and assessing emotional development and can produce information about the child's level of implicit and explicit emotional capabilities on different levels of mental organization.

The literature review revealed that is was relevant to develop a measurement tool that offers helpful in-depth information on emotional-age-specific development, emotional competencies and emotional vulnerabilities.

The empirical study together with the preliminary ad hoc sample from Hogrefe Ltd. found that the EDS-P, based on an NADP understanding, is a consistent, reliable and valid measure of 4–12-year-olds' emotional development, competencies and vulnerabilities on the autonomic, limbic and prefrontal levels and offers a summarized total score of the three levels. The internal consistency between the two scales EDS-P and the EDS-A, showed that the scales cannot be merged into one scale; further, the validity study showed that it is uncertain what the EDS-A measures. The EDS-P's ability to distinguish between referred and non-referred groups demonstrated by the concurrent validity and the predictive validity of the progression showed promising results, although the findings were not as clear as expected. In the study of construct validity, the results indicated a connection between the child's emotional development, the parent's mentalizing capacity and the parent-child interaction, although it was not as straightforward as expected, which will be discussed below regarding the analyses of validity, where the EDS is compared with other measures.

## 7.3 DISCUSSION OF THE RESULTS FROM THE LITERATURE REVIEW

The literature review described in Chapter 3 found no measurement tools that included

a performance test measuring mental organizations of emotional development or scales measuring the level of emotional development. Also, no measurement method was found that divides emotional dimensions into mental organizations and looks at emotional development, apart from the NMT. In the literature search, no other measurement tool that assesses both autonomic, limbic and prefrontal aspects of emotionality besides the NMT was found.

### 7.3.1 COMPARING THE NMT AND EDS

NADP and neurosequential theory have much in common, in part because both theories draw on brain research concerning the consequences of severe psychological trauma and concerning the brain as a hierarchical structure. To clarify how the EDS relates to the NMT, it will be helpful to outline a broad perspective on human development. Human development can be viewed as occurring within three main domains: cognitive, motor, and emotional. In the average child, these developmental domains emerge simultaneously, and it is difficult to distinguish one developmental domain from another, as they are usually interlinked (Hart & Birck, 2018).

### 7.3.2 HOW THE NMT AND EDS MIGHT SUPPLEMENT EACH OTHER

The EDS draws on NADP and consists of a performance test (EDS-P) and a structured assessment (EDS-A) rated by a psychologist based on information from parents and professionals. Like the EDS-A, the NMT utilizes a structured assessment rated by the clinician and helps provide a structured understanding of developmental history of adverse experiences and relational health. Where the EDS-A investigates emotional development, the NMT measures current brain-mediated functioning (ibid.).

A central aspect of both the NMT and the EDS is their developmental sensitivity. The NMT process asks the clinician to estimate the nature, timing and severity of adverse experiences as well as the potential resilience-related factors, primarily related to relational health (Perry & Hambrick, 2008; Mackinnon, 2012; Perry, 2008; Barfield et al., 2014). Other commonly used metrics and inventories measuring “trauma” do not have this developmental dimension, nor do they incorporate potential stress-attenuating factors, such as relational buffers or connection to community (Perry, 2014). As described above, the EDS is similar to the NMT in this way.

Given the common base in a developmentally sensitive and relationally based approach and in a performance test paradigm, the EDS can be a helpful supplement to the NMT when clinicians score items regarding emotional dysfunction. much as the functional data for a client gathered in either quantitative (WISC and WAIS) or qualitative ways can be a helpful supplement regarding cognitive information (Perry, 2014). Furthermore, the EDS can provide important in-depth information regarding emotional development with a “higher resolution” after an assessment of the

preliminary NMT (Hart & Birck, 2018). The NMT and EDS may supplement each other in substantial ways, which further research may reveal.

### 7.3.3 HOW THE NMT AND THE EDS DIFFER FROM EACH OTHER

The NMT paints an overall picture of all three developmental domains mentioned above: motor, cognitive and emotional. The NMT metrics are designed to provide a broad overview and structural context for clinical problem-solving (Perry & Hambrick, 2008; Perry, 2006; Perry, 2009; Perry, 2014). The EDS, by contrast, focuses exclusively on the emotional development domain. An example is that, from an EDS perspective, prefrontal tasks do not include IQ and abstract problem-solving (as, for example, the WISC), but they do include the evaluation of complex social interactions and mentalizing competencies (Hart & Birck, 2018). The NMT is applied in multiple clinical populations across the full developmental spectrum, from infants to adults, including maltreated children and youth (Barfield et al., 2011), while the current edition of the EDS is developed for children between 4 and 12 years of age.

The EDS focuses exclusively and in depth on emotional development and consists of both a performance test (EDS-P) and a structured assessment based on interviews with important caregivers (EDS-A), while the NMT only consists of reporting/interviews. While the NMT over time would be able to provide psychiatry services with a revolutionizing modern method of measuring psychiatric symptoms from a developmental approach, based on contemporary research into affective brain development, the EDS measures emotional development, competencies and vulnerabilities according to developmental age in order to provide psychologists with a structured way of organizing interventions.

## 7.4 DISCUSSION OF EDS FINDINGS FROM THE EMPIRICAL STUDY

This section discusses the findings in detail. It relates the findings of the present study to the research and literature presented in Chapter 2.

### 7.4.1 DISCUSSION OF RELIABILITY

In the following, the focus of the reliability study is on the EDS-P, as no interrater or test re-test reliability study was conducted regarding the EDS-A. The internal consistency is discussed regarding the EDS-P, the EDS-A, and the two scales combined.

The statistical analysis suggests a strong interrater reliability for the EDS-P (see Table 1 in Paper 3). This was revealed even though the raters only received brief training. This finding offers support to the reliability of the instrument, and an even higher interrater reliability can be expected with more thorough training.

The test-retest analysis indicates a strong significant correlation between the first and the second testing of the child. The analysis confirms hypotheses 1 and 2 described in Chapter 5 derived from research question I (See Table 2 in Paper 3). Unfortunately, there was a dropout of 25.71 % in the test-retest study. A high dropout rate may affect the outcomes of the study and bias the sample, which may reduce the generalizability of the findings (Oosterwegel & Oppenheimer, 1993). All the children involved in the empirical study were referred, and it is difficult to know if the dropout rate would have been similar with non-referred groups. The reason for dropping out was that the children in the empirical study were resistant to take part in the retest. According to the test psychologists it was the most vulnerable children who opted out. As described in Paper 2, the reason might be that emotionally vulnerable children find it difficult to interact socially, which is an important aspect in measuring emotional competencies, and will be further discussed later in the chapter. It is difficult to assess whether the test-retest reliability would have been as high if all 35 participants had joined the retest. Further research may yield more substantial results regarding test-retest reliability and conclude whether the EDS-P is suitable for pre/post assessments of the most vulnerable children.

Likewise, it was the same psychologist who performed both test and retest. That made it difficult to assess whether the outcome would have looked different if another psychologist had conducted the retest (cf. Chapter 2 and Paper 1).

Even though a significant positive correlation coefficient was found in the test-retest there seemed to be several factors that might affect the scoring and results (Coolican, 2014; Robson & McCartan, 2016). These included the child's willingness and motivation to do the activities and, more importantly, the test psychologist's way of engaging and synchronizing in a reciprocal relationship with the child. One possibility was the child's different attitude towards the activities when presented with the test for the first time and novelty effect at the retest, although this would be very subtle.

### 7.4.2 DISCUSSION OF THE INTERNAL CONSISTENCY

The analysis reveals that the three scores – autonomic, limbic and prefrontal – and the total score for both the EDS-P and EDS-A appear to have good internal consistency, which confirms hypotheses 3 and 4 derived from the research question I described in Chapter 5 (see Tables 3 and 4 in Paper 3). It is therefore appropriate to calculate total scores separately for the EDS-P and the EDS-A. Especially the EDS-P scale can be used to assess the level of the child's resources and vulnerabilities regarding a hierarchic nature of emotional development as NAPD suggests. This provides an opportunity to design a specific intervention plan based on the strengths and weaknesses that can be detected in EDS-P, as described in Paper 2.

Regarding the internal consistency between the EDS-P and EDS-A the empirical study revealed few significant correlations (see Table 5 in Paper 3). Hypothesis 5

described in Chapter 5 derived from research question I is therefore not confirmed. Because no significant correlations were found between the two scales: the EDS-P and EDS-A in the empirical study, a statistical analysis was conducted for a preliminary ad hoc sample from Hogrefe Ltd. The sample from Hogrefe Ltd. revealed significant and modest correlations between scales on the EDS-P and the EDS-A (Table 8 in Chapter 6). This may be because the population size in the sample of the empirical study was simply too small to detect significant correlations. The significant and modest correlations between the EDS-P and the EDS-A in the preliminary ad hoc sample from Hogrefe Ltd. might reveal that the EDS-P and the EDS-A measure different aspects of the same construct of emotional development, and that the two scales thus appear to support each other. The significant modest correlations may also be due to type II errors.

Through a questionnaire to the psychologists in the empirical study it was revealed that 11 psychologists, responsible for 23 uptakes, had treated the EDS-A as an interview to uncover the parent's experience of the child rather than the psychologist's assessment of the child based on information both from the parent and from the psychologist's knowledge of the child through the uptake of the EDS-P. These 11 psychologists had conducted the EDS-A before administering the EDS-P. As described in Chapter 4, this confusion may stem from the fact that in the initial development of the EDS-A, it was intended as a structured interview aimed at discovering the parent's internal representations of the child. This was changed, however, so the EDS-A is now a structured assessment rated by the psychologists based on gathering information from as many informants as possible to supplement information regarding emotional aspects of the child that cannot be obtained through the EDS-P. To the psychologists responsible for the uptake in both the empirical study and the preliminary ad hoc sample from Hogrefe Ltd., this difference was not clear, apparently due to shortcomings in their training. As the validity study confirms it is uncertain what the EDS-A in fact measures.

In an informal correspondence with the psychologists conducting the EDS-A regarding their experience with the tool, they replied that both the EDS-P and the EDS-A gave a good picture of the child, and many parents had expressed that the questions in the EDS-A had prompted them to think differently about the child. Further analysis and research may shed light on how the EDS-P and the EDS-A can supplement each other, which awaits the factor analysis in the Hogrefe Ltd study (see Chapter 5). A possibility is that the EDS-A can be a part of the intervention to change the parent's internal representation of the child as well as a measure for assessing whether their inner representations of the child change over time in pre- and post-measurements.

### 7.4.3 DISCUSSION OF CONCURRENT VALIDITY

In comparing referred and non-referred groups on the EDS-P, independent samples t-tests revealed a significant difference between the referred and non-referred groups on all the levels as well as total scores of 4–12-year-olds (Table 6 in Paper 3 and Table 16 in Chapter 6). The EDS-A showed even greater mean differences (Table 9 and 17 in Chapter 6). A discussion of the comparison between referred and non-referred groups for 4–12-year-olds in the EDS-P can be found in Paper 3. This confirms hypothesis 6 described in Chapter 5 and derived from research question I that the EDS can be used to evaluate emotional competencies and setbacks through both the EDS-P and the EDS-A, although they do not measure the same construct. Further research may reveal how they differ from each other.

#### 7.4.3.1 Differences Between Non-Referred and Referred Groups Regarding Age Groups 4-8-Year-Olds and 9–12-Year-Olds

The differences between groups of non-referred 4–8-and 9–12-year-olds and between groups of referred 4–8 and 9–12-year-olds on the EDS-P are presented in Table 7a and 7b in Paper 3, while the EDS-A is addressed in Tables 10, 11 and 17 in Chapter 6. A progression in emotional competencies was found between 4–8-year-olds and 9–12-year-olds in both the non-referred and referred groups, although the progression was substantially greater for the non-referred than the referred group. In the referred group, the limbic score revealed no significant difference, which will be discussed later in the chapter. These results may indicate that the EDS captures differences in the progression of emotional competencies and measures the extent of developmental disorders depending on biological age, based on whether the child is referred or non-referred. The results may also reveal that emotional imbalances or family-related dysfunctions that motivated the referral of the child also caused setbacks in the development of emotional functions. This confirms hypotheses 7 and 8 described in Chapter 5 derived from research question I that the EDS-P and the EDS-A may reveal a progression of emotional competencies between groups of referred 4–8 and 9–12-year-olds and groups of non-referred 4–8 and 9–12-year-olds, except on the limbic score regarding the referred group in both the EDS-P and the EDS-A, which will be discussed later.

Regarding the analysis of the difference between groups of referred and non-referred 4–8-year-olds and between groups of referred and non-referred 9–12-year-olds on the EDS-P, substantial mean differences were revealed, with one exception regarding 4–8-year-olds, where no significant difference was revealed on the limbic (Tables 12, 14 and 16 in Chapter 6). On the EDS-A, independent samples t-tests revealed substantial significant differences between referred and non-referred 4–8-year-olds and even more substantial mean differences between referred and non-referred 9–12-year-olds (Tables 13, 15 and 17 in Chapter 6). The mean difference was greater on the EDS-A than on the EDS-P. This confirms hypotheses 9 and 10 described in Chapter 5 and derived from research question I, except for 4–8-year –olds on the limbic score,

that it is possible to distinguish between referred and non-referred groups, both among 4–8 and 9–12-year-olds on the EDS-P and the EDS-A. This result may either uncover inconsistencies in the choice of items on the limbic level both in the EDS-P and EDS-A or reveal that among 4–8-year-olds, the reason for referral is not associated with competencies on the limbic level but has much more to do with vulnerabilities and self-regulation problems related to autonomic and prefrontal functions. Also, the difference between the EDS-P and the EDS-A may reveal that the parents respond to the child's behaviour, and that it may be difficult for them to rate their children correctly. Thus, if they have no cause for concern, they perceive their child to be well-regulated, and if they do have concerns regarding the child, including the reasons for referral, they perceive their child in a more negative light (Stern, 2000). It may also indicate that the parent of a non-referred child, in contrast to the parent of a referred child, is capable of modifying his or her internal representations according to the child's maturational process, or his or her representations are positively biased, as described above in the discussion about internal consistency (ibid).

#### 7.4.3.2 Differences Between Non-Referred and Referred Groups Regarding Gender on the EDS-P and EDS-A

Independent samples t-tests revealed statistical differences between referred and non-referred girls for the autonomic, prefrontal and total scores on both the EDS-P and EDS-A. On the limbic level a significant difference was revealed regarding the EDS-A, but not the EDS-P (Table 8a in Paper 3; Tables 18, 20 and 21 in Chapter 6). Independent samples t-tests revealed significant differences between referred and non-referred boys in terms of scores on all levels: autonomic, limbic, prefrontal and total with a much greater difference than for girls both on the EDS-P and EDS-A (Table 8b in Paper 3 and Tables 19, 20 and 21 in Chapter 6). This confirms hypotheses 11 and 12 described in Chapter 5 derived from research question I that the EDS-P and the EDS-A can distinguish between groups of referred and non-referred girls and between referred and non-referred boys. A further discussion can be found in Paper 3. The differences in means were more substantial on the EDS-A than on the EDS-P, which may, again, stem from difference in the parent's perception of the child in the referred versus the non-referred group.

#### 7.4.3.3 Differences Between Groups of Girls and Boys on the EDS-P and the EDS-A

A comparison between boys and girls amongst the group of referred on the EDS-P revealed significant differences regarding the autonomic, prefrontal and total scores in favour of the girls, but no significance was revealed on the limbic level (Table 9a in Paper 3). Regarding the group of non-referred, no significant differences between girls and boys were revealed on the EDS-P (Table 9b in Paper 3). On the EDS-A, no significant differences between girls and boys, neither in the groups of referred or non-referred was revealed (Tables 22 and 23 in Chapter 6). This only partly conforms hypothesis 13 described in Chapter 5 derived from research question I, as the EDS-P

is partly able to distinguish between girls and boys, but not the EDS-A. Hypothesis 14 cannot be confirmed as amongst the group of non-referred girls and boys as no significant difference was revealed neither on the EDS-P or the EDS-A. This shows that when correlating data for boys and girls, their mutual connection in both referred and non-referred groups, is complicated, as described in Chapter 2, and cannot be measured on the EDS.

### 7.4.4 DISCUSSION OF THE PREDICTIVE VALIDITY OF THE EDS-P AND THE EDS-A

The analyses of predictive validity were investigated by determining the progression of the three hierarchical levels on the EDS. Within the NADP perspective one would expect mean scores on the autonomic level to be higher than mean scores on the limbic level, just as mean scores on the limbic level would be expected to be higher than mean scores on the prefrontal level or the three levels would be expected to be equal (see Chapter 4).

When the two samples for both age and gender was merged, the progression was not as clear as expected, due to a low limbic level on the EDS-P and a high limbic level on the EDS-A. Hence, the merged sample was divided into a referred and a non-referred group (see Table 24 in Chapter 6). For the referred group, a clear indication of progression on both the EDS-P and the EDS-A was found for all age groups and both genders (see Tables 25, 27 and 28 in Chapter 6). A similarly clear result was not found for the non-referred group due to a low limbic level on the EDS-P and a high limbic level on the EDS-A, However, the autonomic and prefrontal levels are well balanced with a clear progression on the two levels of both the EDS-P and the EDS-A. This tendency is found for all age groups and both genders, as the autonomic level is considerably higher than both the limbic and the prefrontal level for all age groups and both genders (see Tables 26, 29 and 30 in Chapter 6). Some progression was also found in the non-referred group for both the EDS-P and the EDS-A. Hypothesis 15, which is described in Chapter 5, derived from research question II, is confirmed for the referred group and partly confirmed for the non-referred group, but more research is needed.

There is substantial difference in mean of max scores between the referred and the non-referred group on the autonomic and prefrontal levels and a lack of differentiation of score levels on the limbic level between the referred and the non-referred group. The lower scores on the autonomic level for the referred group might be related to difficulties with arousal and temperamental regulation, as suggested in NADP (see Chapter 2, Paper 2). As described in Chapter 2, the arousal regulation capacity is important for developing prefrontal functions (Fonagy et al., 2002), and as mentioned earlier, referred children also seem to struggle with prefrontal functions (Snyder, Miyake & Hankin, 2015).

The lack of a predictive progression in the preliminary ad hoc sample from Hogrefe

Ltd. may reflect that the EDS does not capture emotional development on the limbic level, it may be due to insufficient training of the psychologists, or it may reveal general trends in society. The result suggests that the large group of non-referred children in the sample from Hogrefe Ltd. show highly developed prefrontal competencies, but not necessarily high limbic competencies. As proposed in Paper 3, this could be due to the demands in Western European society that places a high priority on the ability to self-regulate, perform acts of will and exercise impulses inhibition, and where the stimulation of prefrontal structures through education plays a key role (Rybanska, McKay & Jong, 2017). According to Choudhury (2010) it takes well-developed prefrontal functions to thrive in a Western European society, as proposed in Papers 1 and 2. If the research results are confirmed in a larger study, this gives us cause for concern. A society that prioritizes cognitive skills while neglecting emotional, personal and social development will override essential human needs, such as the needs for attachment, affiliation and empathy. This may result in an excessive focus on eliminating emotional problems through psychiatric diagnoses and medication (Brinkman, 2016; Jørgensen, 2012).

Further research into the non-referred children's mentalizing capacity could reveal whether there is a correlation between low limbic and low mentalizing capacity, even if the prefrontal competency is high, as the mentalizing capacity is only one aspect of the prefrontal capacity (Fonagy et al., 2002). If the result is confirmed in a larger study, it may reveal that our society emphasizes stimulation of cognitive functions at the cost of emotional functions (Inzlicht, Bartholow & Hirsh, 2015). An item-level factor analysis of the distribution of prefrontal scores on the EDS-P from the full Hogrefe Ltd. sample might reveal a correlation between the limbic scores and specific items on prefrontal scores that measure the mentalizing capacity as separate from other prefrontal functions that do not directly load onto emotional functions, such as impulse control, acts of will and reflective functioning.

Further research is needed to examine this inconsistency of the results from the study of progression, which may partly be due to the small sample size and partly due to the method of calculating the mean based on max scores, which does not reflect the full dimension of the progression. Further research may reveal if a correlational analysis, as expected, would provide the same result as the mean based on a percentage of max scores. If a norm and a cut-off for the three levels had been developed it would have enabled a sounder statistical analysis of the quality of the progression (*Standards for Educational and Psychological Testing*, 2014), This was not possible in the present empirical study due to the low number of participants. Also, a sample must include a representative segment of a total population before it is possible to measure significant norms and cut-off scores, which was out of reach in this empirical study.

### 7.4.5 DISCUSSION OF COMPARING DIFFERENCES OF THE EDS-P AND THE EDS-A

As seen in Table 31 in Chapter 6, the parents of the referred children rated their children more negative through the EDS-A than the parents of the non-referred children compared to the psychologist's scorings assessed though the EDS-P. A possible explanation for the low number of significant correlations between the EDS-P and the EDS-A in this study may be that the parents, most of them from the empirical study, who themselves were referred together with the child to a family treatment centre, had unrealistic negatively biased internal representations, especially regarding the 9–12-year-olds, that did not match the child's emotional capacity as shown on the EDS-P and evaluated by the psychologist. This issue is addressed in the discussion of internal consistency in Paper 3. In Table 31 in Chapter 6, this tendency is clearly revealed (Crittenden, 2016; Rosenblum et al., 2008; Slade et al., 2005). The significant correlations between the EDS-A and the EDS-P in the non-referred group may reflect that parents from this group have more realistic and modestly positively biased internal representations of their child, especially on the autonomic and prefrontal levels. On the limbic level, the results show a significant positive bias. Research (see Chapter 2) has revealed that insecurity, stress and psychological imbalances reduce a person's mentalizing capacity and make internal representations more rigid, negative and unrealistic (Katznelson, 2015). Further research must reveal whether there is greater correlation between the EDS-P and the EDS-A with non-referred parents than with referred ones. From an NADP perspective, the parent's internal representations of the child might be more positively biased in the non-referred group compared to the referred group, as research shows that parents with a mildly positively biased internal representation of their child are associated with a good prognosis for good attachment (Stern, 2000). The significant positive bias in the preliminary ad hoc sample from Hogrefe Ltd. on the limbic level may uncover that the items utilized to measure the limbic level needs more consideration, or it may reveal that the parent may be unrealistic regarding his or her well-functioning child's ability to be empathic and emotionally attuned with others.

### 7.4.6 DISCUSSION OF COMPARING THE EDS WITH OTHER MEASURES

The discussion of construct validity concerns the results of correlating the EDS findings with the two standardized questionnaires and the two recently developed methods MIM-P and NMI.

#### 7.4.6.1 Comparing the EDS with the PSI and the PCRI

There is a significant and modest negative correlation as expected between the EDS-P and the PSI regarding the child domain on the autonomic level of the EDS-P and the parent's internal representation of the child's adaptability, as scored on the PSI (Table 32, Chapter 6). This may suggest a connection between the parent's perception of their child's adaptability and the child's arousal regulation and sensorimotor

capacity due to the mutual influence between the parent's self-regulating capacity, his or her perception of the child and the child's self-regulating capacity as associated with the brain's autonomic structures (Paper 1; Hart, 2011). There is a significant and modest negative correlation in the expected direction between the autonomic, limbic and prefrontal levels on the EDS-A and the PSI regarding the child's adaptability and acceptability and the total score of the PSI, which may suggest that the EDS-A in general has been treated as a structured parent interview rather than as a structured assessment of the child, rated by the psychologist. This was confirmed and described earlier in this chapter based on a questionnaire that was sent to and completed by the participating psychologists.

There is a significant and modest negative correlation in the expected direction between the EDS-A and the PSI regarding the parent domain in the dimensions of depression and spouse (Table 33, Chapter 6). This finding may suggest a minor connection between the parent's perception of feeling depressed and lack of support from the spouse, related to how the parent perceives the child's emotional functioning (Huang et al., 2014). That is to say that the parent's evaluation of the child is correlated with other aspects of adult life that are unrelated to the child.

Only a few statistically significant correlations were revealed between EDS scores and all subscales from the PCRI, and the correlations with significance had an unexpected direction (Table 34, Chapter 6). The limbic level on the EDS-P correlated negatively with the parent's representation of giving the child support and setting limits. Regarding the prefrontal level on the EDS-A, there is a significant and modest negative correlation in the expected direction between the parent's representation of being engaged in the child and his or her satisfaction with being a parent and the parent's perception of the child's capacity to inhibit impulses, manage demands through acts of will and make cognitive reflections. This finding suggests a minor negative connection between the parent's representation of own satisfaction with the parental role, and internal representation of giving the child support and setting limits for the child, and the parent's understanding of the child's development of emotional attunement with others (Hart, 2011). It also suggests a minor negative connection between the parent's perception of the child's capacity to, for example, delay gratification and mentalize and the parents' representation of finding satisfaction with the parent role, and also of being involved in taking care of the child's needs. As described in Paper 1 and Chapter 2, there is a connection between the parent's mentalizing capacity and the child's emotional development. It is difficult to interpret these findings, and more research is needed.

The correlation between the EDS and the PSI/PCRI was less than expected, and thus only partially confirms the correlation between the EDS-P/EDS-A and the PSI/PCRI proposed in hypothesis 16 described in Chapter 5, derived from research question III. It is important to emphasize that this can be due to the difference between questionnaires, interviews and performance tests. It may also suggest that referred

parents are more vulnerable, for various reasons, and that the stressful condition bias their internal representations of their child and their perception of their interaction with their child negatively, as stress reduces their mentalizing capacity, as described in Paper 1 (see also Hart, 2011). As Fonagy et al. (2002) conclude, stress reduces the mentalizing capacity, leaving the internal representations rigid and inaccurate.

#### 7.4.6.2 Comparing the EDS and the NMI

No significant correlations were found between the EDS-P, the EDS-A and the NMI, a finding that does not confirm hypothesis 17, that a correlation would be revealed between the EDS-P/EDS-A and the NMI. This suggests that there is no correlation between the referred parents' mentalizing capacity and their children's emotional development and competencies, as measured on the EDS-P. Also, there is no correlation between the parent's understanding of the child as measured by the EDS-A and the NMI. This was an unexpected finding, as much research has revealed the correlation between secure attachment and high mentalizing capacity (Katzenelson, 2015; Sleede, 2013).

The result reveals that it is not only parental mentalization capacity that is important for the emotional development of 4–12-year-olds. There may be other important factors, such as other important family members or adults to whom the child is closely related, just as peers may have a special impact. The child's inherent prerequisites for self-regulation also play an important role in this regard. In addition, there is no linear causality between the referred parent's and the child's internal representations of the outside world, often referred to as the transmission gap (Bernier et al., 2014; Verhage et al., 2016). In addition, the result reveals that there is no correlation between the parent's internal representations of his or her child and the parent's mentalizing capacity, which may indicate that there can be a substantial distance between the parent's understanding of the child and the parent's mentalizing functions. There seem to be strong indications that there is an important connection between parental mentalizing capacity, the parent's coherent understanding of him/herself and the child, the ability to take the child's perspective and the ability to see the relationship from a third person's perspective. This connection could be due to the link between parental mentalizing capacity and reality testing and the ability to create a secure base for the child (Hart, 2011). There seems to be apparently a stronger correlation between a parent's mentalizing ability and the child's attachment pattern (see Chapter 2). Further research may reveal the differences between referred and non-referred families, and the link between attachment pattern and emotional development.

#### 7.4.6.3 Comparing the EDS and the MIM-P

The NMI, the PSI and the PCRI measure the parent's internal representations. Comparing the EDS-P and the MIM-P, the psychologist is the observer of the child's emotional competency and the intersubjectivity between parent and child; both measures are obtained and rated by the same psychologist. In the comparison of the EDS-A and the MIM-P, the psychologist is the observer of the intersubjectivity

between parent and child, which are correlated with the parent's and the professional's internal representations of the child. In the study there is an overrepresentation of mothers. The findings of the whole group in the empirical study only reveal significant findings regarding the EDS-A (Table 35, Chapter 6), but when the participants were divided into age and gender groups significant findings are also revealed regarding the EDS-P. The findings reveal significant and modest correlations between the EDS-P on the autonomic and prefrontal levels and the MIM-P regarding 4–8-year-olds, concerning the MIM dimensions of structure, synchronizing capacity and receiving nurture (Table 34, Chapter 6). Among the 9–12-year-olds, there is a significant and modest correlation between the limbic and prefrontal level of the EDS-P and the child's capacity to engage and to be challenged ((Table 36, Chapter 6). These findings suggest that 4–8-year-olds are more dependent for their emotional functioning on the parents' way of offering regulation, engagement and nurture than 9–12-year-olds, as neural immaturity demands more regulation and nurture from the environment for the child to be able to self-regulate (Hart, 2016). For the 9–12-year-olds, their capacity for affective attunement enhances engagement between parent and child, and at this age they need their parent to challenge them in an appropriate way to develop self-regulatory capacity, since at this age, children are better able to self-regulate and need to be challenged accordingly (Hart, 2011).

An unexpected negative correlation is found among boys between the EDS-P on the autonomic level and total score and the MIM-P structural dimension (Table 38, Chapter 6). This finding suggests that boys may be more dependent on the mother's ability to structure the interaction than girls are, and that the mother compensates by providing more structure when her son is more dysregulated, while she is more relaxed regarding structure when the son is calm (see Chapter 2; Tannen, 1990).

There are significant correlations between the EDS-A and the MIM-P regarding boys (Table 38, Chapter 6). The mothers' understanding of their boys' emotional functioning on the limbic level correlates with how well the boys engage with their mother and their ability to receive nurture. This finding may suggest that boys are more dependent on being understood, and they profit from the mother's positive internal representations. No significant correlation was found between the MIM-P and the EDS measures of the girls' emotional capacity. This may suggest that 4–12-year-old girls are more capable of compensating when their mother cannot offer sufficient emotional regulation, for example by socializing with others in intimate relationships, and that they are less dependent on the mother-child relationship than boys, due to greater socializing capacities, as described in Chapter 2 (Baron-Cohen, 2003). Hypothesis 18 described in Chapter 5, derived from research question III – that there is a correlation between the EDS-P/EDS-A and the MIM-P – is only partially confirmed.

#### 7.4.6.4 Comparing the MIM-P and NMI and Relating the Results to the EDS

Although the construct validity of the MIM-P and the NMI lies outside the scope of

the empirical study, several interesting correlations were found between the MIM-P and the NMI and can be related to the EDS (Table 39, Chapter 6). It should be kept in mind that the significant and modest correlations might be related to the fact that the same psychologist scored the MIM-P and the NMI.

Many significant and modest correlations were found between the mother's mentalizing capacity and the MIM-P on parental dimensions. This involved the parent's capacity for reciprocal synchronization with the child, having fun, being aware of the need to provide nurture and challenging the child in an age-appropriate way. This finding may suggest that the way the parent mentalizes the child has a great importance for the parent's capacity to create an atmosphere of shared intersubjectivity (see Chapter 2). This may reveal that the quality of the intersubjectivity between parent and child is more dependent on the parent's mentalizing capacity than on the child's emotional development and competencies.

This finding underscores the importance in family and child therapy creating an intervention plan that focuses on enhancing the parent's mentalizing capacity, which in turn supports the child's emotional development through child-parent interactions (see Paper 1; Bentzen & Hart, 2016). As described in Paper 1, it is important not only to determine the child's zone of proximal emotional development but also the parent's zone of proximal emotional development, which may be identified based on the mentalizing capacity.

### 7.4.7 SUMMARY OF THE DISCUSSION REGARDING RELIABILITY AND VALIDITY OF THE EDS

The empirical study revealed that the EDS can be administered in a consistent and stable manner with standard procedures and good psychometric properties. This moves the EDS one step closer to standardization.

Despite the differences between the assessment measures the study reveals correlations between the level of the child's emotional functions, the parents' level of mentalization and their intersubjectivity. The study has also revealed correlations between the standardized questionnaires (PSI and PCRI) and the EDS. The correlations require theoretical interpretation, as human emotional development is a complex phenomenon. As the EDS is expected to measure a new construct, it does not have complete coherence with other measurement tools. If, by chance, a very strong correlation was found between the EDS and another measure, this would have made the EDS redundant, indicating that the EDS measured a construct that other instruments were already measuring.

## 7.5 DISCUSSION OF RESEARCH METHOD

In the following section, the research design and method are discussed. This includes

clarification of the limitations of the study and recommendations for further research.

### 7.5.1 EVALUATION OF THE EDS PROTOCOL

In the following, both the EDS-P and the EDS-A protocols are evaluated. The evaluation examines limitations of procedures, clinical recommendations for conducting the assessment using the EDS-P and conducting the structured assessment using the EDS-A.

### 7.5.2 CHOICE OF MEASURES

Within this study it can be discussed whether a performance test with the child (EDS-P), a structured assessment consisting of quantitative scores based on reports from parents (EDS-A) and a structured observation of parent-child interaction (MIM-P) correlated with the parent's mentalizing capacity (NMI) and self-reporting questionnaires (PSI/PCRI) can be compared and can grasp the full complexity of emotional development. However, this empirical study mainly addresses the issues of reliability, validity and correlations of different types of data, to find out the correlations between them.

As no standardized methods for exclusively measuring age-specific emotional development and competencies that match the EDS could be detected in the literature review (see Chapter 3), the EDS was correlated with two standardized questionnaires aimed at parents' self-reported assessment of parenting-related stress and their relationship with the child. According to NADP, children's emotional development is closely associated with the primary caregiver's emotional capacities and internal representations of the child (see Chapter 2; Paper 1; Paper 2). As the NMT was the only measurement tool found to deal with children's emotional development – although few have yet had the opportunity to be trained in it – it was necessary to find other options to carry out the validity study. Because of the knowledge gained from NADP that there is a partial relationship between the children's and the parent's emotional competencies and the parent's internal representations of being a parent, the choice was to use standardized questionnaires regarding the parents' view of themselves and their child, to study if there was a correlation between them.

Conducting construct validity analyses by using different measures often yields poor results, although all included measurement methods use a coding system based on a Likert-scale response format (*Standards for Educational and Psychological Testing*, 2014). Taking this into consideration, the researcher did find significant correlations, although not as convincing as they might have been if the EDS were correlated with similar observation-based assessment measures.

The EDS-P and the EDS-A were developed to supplement each other. Unfortunately, the training of the psychologists in both the empirical study and the preliminary ad

hoc sample from Hogrefe Ltd. failed to emphasize that the EDS-A was a structured assessment to be completed by the psychologist and was supposed to be conducted after the uptake of the EDS-P. The results of the EDS-A are presumably based more on the parent's internal representations of the child than on objective information about the child's emotional development and competencies obtained by the psychologist. It is thus considered as a limitation that the training was not sufficiently clear, and in the further development of the EDS-A it will have to be clarified if the EDS-A can be used both as a measure of the caregiver's internal representation of the child and as a structured evaluation of the child's emotional development, competencies and vulnerabilities assessed by the psychologist.

If the EDS-A is to be used as a structured interview with the parents, rather than a structured assessment to be completed by the psychologist by obtaining information about the child from relevant informants, it has to take into consideration that the parent's reflections of his or her child may be very different from what is observed by professionals. As mentioned in Chapter 5, this is not about whether the parent is answering truthfully or not, but rather reflects that the parent may not have a clear picture of the child. If the EDS-A is to be used as a structured assessment to be completed by the psychologist based on information about the child from relevant informants, further analysis may reveal how the EDS-P and the EDS-A can supplement each other, as the purpose of combining a performance test and a structured assessment in the same measurement tool is to collect information about the child both within a safe, stable and supportive setting and in the child's natural environment.

Since the EDS-P and the EDS-A investigate the same emotional features it is relevant to examine the relationship between the two different methods of information collection. It has not yet been considered how to construct an analysis that weights both the results from the EDS-P and from the EDS-A. When the factor analysis from Hogrefe Ltd. is terminated, it will be possible to better determine what information the EDS-A can reveal, and how the EDS-P and EDS-A may relate to each other. Finally, it is important to bear in mind that both the EDS-P and the EDS-A can only yield information about aspects regarding the child's emotional development and competencies here and now; they do not cover the whole spectrum of the child's emotional capacities and potential for development (Poulsen & Simonsen 2017).

### 7.5.3 THE RATER'S AGENCY

As proposed in Chapter 2, the psychologist's agency and interaction with the child might have influenced the results of the EDS scores. EDS-P is a performance test, where the child's competencies are assessed through interactions with a psychologist. The scoring relies heavily on the psychologist's observations and judgment, which always contains a subjective element. It is not possible to compensate completely for this limitation, and in quantitative studies this issue is dealt with through interrater

reliability. To ensure a high interrater reliability, when the test is further developed, the psychologists will be advised to go for a certification to ensure that their scorings are reliable. Another limitation of the EDS-P is that the child is alone with the rater, who tries to make sure that the child is comfortable. In this setting, the child is expected to perform better than when he or she is not given this type of close contact. If, as part of further research, an empirical study is conducted with the EDS, where the EDS-A is used as intended, that is, as a structured assessment of the child's emotional development, capacity and vulnerability in daily-life settings, it will be possible to conduct further reliability studies of the correlation between the EDS-P and the EDS-A and to measure whether there is a difference between the child's performance on the EDS-P in the supported setting compared with the daily-life setting, with all its stressors, as measured on the EDS-A.

Being authentic while seeking to facilitate synchronized attuned interactions and a reciprocal relationship is important, and a failure to do so can influence the results of the EDS-P. For instance, the psychologists stated that they gradually became more relaxed as they became more familiar with the items of the EDS-P. However, many of the difficulties that the psychologists experienced in the early data collection were picked up during the uptake and solved. The problems that occurred at the beginning of the uptake, both in the empirical study and in the sample from Hogrefe Ltd., were less severe toward the end of the data collection period, indicating that training, precision, understanding and authenticity go hand in hand. Being constrained to specific activities in structured interactions combined with being supportive and synchronizing is a challenge that is seldom discussed in connection with the uptake of performance tests (Jacobsen, 2012). This underscores the need for the psychologist to undergo thorough training in the activities in the performance test in order to be comfortable performing them with the child.

As discussed in Chapter 2, it is important to bear in mind that the psychologist/rater is not an objective observer but learns about the child/family through the interactions that take place during the assessment. Hence, it is important that the person in charge of the assessment or a part of a performance test is aware of his or her own blind spots in the interaction and has received training to overcome them. The psychologist's personality influences the result through countertransference, as some may have a tendency to want to help the child too much, while others do not offer enough assistance (see Chapter 2). The empirical study did not include evaluation of these dilemmas, and more training could have diminished this risk.

### 7.5.4 TRAINING IS NECESSARY

Although the EDS is intended as a clinical tool for psychologists, specific training in how to conduct the test is needed. This is a normal procedure in many psychological testing procedures that contain a performance test or semi-structured interviews, for example mentalizing tests, the NMT, Rorschach and so on. The psychologists'

interactions with the child have great importance for the reliability of the EDS-P. In the training in administering the EDS it is important that the psychologists understand the purpose of the EDS and how the EDS-P and the EDS-A support each other.

To ensure a high interrater reliability, the training should include learning to conduct the activities in an authentic and supportive way without influencing the child's emotional competencies. This could be taught in a two-to-three-day training course that includes examples of what can go wrong or the sort of dilemmas one might encounter. Performing the different analyses and scorings might call for more intense training, leading to a certification, where the psychologists rate videos in a class with others with room for discussions and multiple perspectives, but also rate video sessions alone. The researcher is currently working with two clinical psychologists to produce both training videos and analysis courses, which will be completed after the standardization conducted by Hogrefe Ltd.

## 7.6 LIMITATIONS OF THE EMPIRICAL STUDY

Several limitations of the present study are fully recognized. A larger sample size would enable more valid normal-range calculation. This fact together with the limitation of only conducting a quantitative study and the absence of a non-referred control group limits the generalizability of the results. Finally, it was not possible to train the psychologists properly in the different measures used in the study, which seems to have been particularly troublesome regarding the EDS-A.

The limited sample size and large number of variables in this study raise two opposing problems. Having a small sample size and many results can lead to type I errors, that is, chance findings. However, it is equally possible that the findings have been limited by type II errors, that is, failing to find a statistically significant effects, which in reality are present, since the statistical power to reject the null hypothesis is low, when the number of subjects is low, and true effect sizes are moderate (see Chapter 4; Hanna & Demster, 2012). Considering the small sample size, it would have been beneficial to have applied a mixed-method design where the empirical study could have been correlated with qualitative data, for example by conducting unstructured observations of the children in live settings or by taking a few samples and analysing them in depth (Brinkmann & Tanggaard 2015). Also, it would have been beneficial to conduct an experimental design with a randomized control trial using a control group, for example with a non-referred group as part of the empirical study, where the results from the non-referred group could undergo the same reliability and validity study as in the empirical study (Coolican 2014; Furr, 2011; Howell, 2013; Robson & McCartan, 2016). An important limitation was that it was not possible to blind the group of non-referred and referred, which meant that the psychologists knew whether they were rating a referred or a non-referred child, which may have led to bias.

Eighteen psychologists were involved in the interrater reliability study, but the study was carried out in pairs, as only two psychologists were involved in any given rating due to the limited resources of this research project and the prohibitive amount of time it would have required to have more psychologists rate each sample.

## 7.7 RECOMMENDATIONS FOR FURTHER RESEARCH

To establish reliable norms for the EDS-P and the EDS-A, future research should strive for a larger normative sample of children randomly recruited at day nurseries and primary schools with no inclusion criteria for clinical or nonclinical features.

The item factor analysis that will be run by Hogrefe Ltd. once the data collection period is completed will enable further analysis of both the EDS-P and EDS-A and of how the EDS-P and the EDS-A can supplement each other. Once the standardization process has been completed, the scoring system has been developed, and the rewriting of the EDS-A is completed, new studies for reliability and validity should be conducted that also take aspects of the psychologist's agency and way of interacting with the child into consideration.

Further research may reveal more substantial results regarding test-retest reliability and conclude whether the EDS-P is suitable in pre- and post-assessment method. It will be necessary to consider if the focus of the EDS-A should be to assess the caregiver's understanding of the child's emotional vulnerabilities and capacities, to assess how the child is supported by important caregivers, or to serve as a structured assessment aimed at revealing the difference between how the child expresses his or her emotional capacities in a calm, structured, safe setting compared to the child's reactions in ordinary and/or very demanding situations in everyday life. Further research may also reveal whether there is a stronger correlation between the EDS-P and the EDS-A for parents with non-referred children, rather than referred.

The measure of mean based on a percentage of max scores does not yield convincing results of a progression of scores between the autonomic, limbic and prefrontal levels, though when no progression is found, the three levels are close to equal. Further research is needed to examine this data, when a norm and a cut-off for the three levels have been developed.

Further research on mentalizing capacity could reveal whether there is a correlation between low limbic and low mentalizing capacity, even though the prefrontal competency is high, and if there is a significant correlation between emotional development and attachment pattern. This may call for more research into how the parent's mentalizing capacity correlates with parental capacity to interact with the child through subtle regulation of synchronization and affective attunement in a reciprocal relationship, and how this promotes the child's self-regulating capacity and emotional development.

## 7.8 CLINICAL APPLICABILITY OF THE EDS

The development of the EDS, MIM-P and NMI is based upon an NADP understanding that all higher personality features, including attachment, self-regulation, impulse control and mentalizing, develop through countless macro- and micro-interactions (see Chapter 2; Paper 1; Paper 2). The child's self-regulation capacity is strengthened through interactions with others, and these interactions are subsequently internalized and become part of the child's internal representations and mentalizing processes (see Chapter 2, Paper 2; Cicchetti, 2015; Hart, 2016c). In the development of the EDS it was considered important to base the measure on items that would be challenged by the child's performance, not on questionnaires and projections, and to base the measure on an NADP understanding, which is capable of containing the emotional complexity and developmental issues needed to get a broad understanding of a child's emotional resources and vulnerabilities.

The EDS-P provides a structured way of evaluating the child's emotional competencies with psychometric measures and is designed to be conducted by trained and certified psychologists. It is not a measure intended to stand alone, and it does not cover other important areas, such as the interaction between caregiver and child or the child's cognitive abilities. However, with its focus on the child's capacity to interact with and perform relevant activities in collaboration with the psychologist, the results can guide professionals on how to approach and support the child's emotional capacities on both implicit and explicit levels. Together with a structured method for observing the interactions between parent and child and an assessment of the parent's mentalizing capacity, the EDS-P plays an important part in assessing the child and the child's relational environment.

The EDS-P only requires one assessment session, which means that it is not too demanding for the child to take part in the test. Also, most children found the assessment enjoyable, as many of the items consist of play. However, especially the extreme social vulnerable children, some of them diagnosed within the autism spectrum, were resistant to participate in the retest study, perhaps because they find activities focused on intersubjectivity difficult and awkward. It is rarely fun to be tested on skills that one is not good at. One would expect setbacks in a child's emotional development, when having social and communicative problems. It is of course important to address the ethics of utilizing assessment methods that emotionally vulnerable children withdraw from or feel resistance towards. It needs a skilled psychologist with a high degree of agency to make an emotional vulnerable child secure and confident as discussed above. When something is fun, the rater typically sees more of the child's capacities than his or her challenges, which is an issue often pointed out in e.g. music therapy assessment (Jacobsen, Waldon & Gattino, 2018).

The EDS may also offer an economic advantage for psychiatric, social and educational services, as it can help to reduce the expense of interventions by tailoring the intervention to the child's zone of proximal emotional development, as described in Papers 1 and 2. It may contribute to the assessment process by providing quick and valuable information for professionals in situations where it can be difficult to obtain in-depth detail on the child's emotional capacity within a short period of time to complete and initiate an intervention plan. Furthermore, the research study reveals that the EDS appears to be able to differentiate between non-referred and referred children and might have potential as a screening tool.

As the internal consistency between the EDS-P and the EDS-A showed different results in the empirical study and the sample from Hogrefe Ltd., it is not clear how the two can supplement each other or how to treat the results from EDS-A. That requires further research. In the mean-time it can be used as a clinical interview supporting the information gained through the EDS.

The EDS may be helpful in organizing the intervention according to the level at which the child has his or her fundamental difficulties, as described in Paper 1 and Paper 2. For instance, an intervention for a child with low scores on the autonomic level may emphasize bottom-up strategies, that is, experiential interventions. This might include working with rhythm and synchronization through music therapy or Theraplay, as the processes involved in these types of activities generally appear to improve autonomic functions (Daniel & Trevarthen, 2017; Lindvang & Beck, 2017; Hart, 2016; Jacobsen & Holck, 2016). Children with low scores on the limbic level may profit from a combination of bottom-up and top-down interventions with a combination of experiential interventions with narratives and reflection (Baylin & Hughes, 2016). Finally, interventions for children with high scores on all three levels may profit from top-down interventions, such as cognitive behaviour therapy (Hollon & Beck, 2013) and mentalization-based treatment (Allen, Fonagy & Bateman, 2008), which revolve around dialogues and reflections on emotional topics.

## 7.9 CONCLUSION

The aim of the dissertation was, first, to investigate whether the Emotional Development Scale (EDS) is a reliable and valid measure of 4–12-year-old children's emotional development. Second, to find if there is a correlation between the autonomic, limbic and prefrontal levels of the EDS that is predictive of emotional developmental progression as described in NADP. Third, and finally, to see if there a correlation between the tested children's emotional development as measured on the EDS, parent-child intersubjectivity as measured with the Marschak Interaction Method of Psychometrics (MIM-P) and parental mentalizing capacity as measured with the Neuroaffective Mentalizing Interview (NMI) (now the EMS).

The empirical study together with the preliminary ad hoc sample from Hogrefe Ltd. found that the EDS is a consistent, reliable and valid measure of 4–12-year-old

children's emotional development. There was a difference between referred and non-referred groups, especially on the autonomic and prefrontal levels; as expected, differences were also found between 4–8-year-olds and 9–12-year-olds. The measure of mean based on max scores on the EDS-P and EDS-A in the referred group suggests a progression or equality of levels between the autonomic, limbic and prefrontal mental organizations for all age groups and both genders. The same clarity was not found in the non-referred group due to a low limbic level on the EDS-P and a high limbic level on the EDS-A. The study of the differences between the EDS-P and the EDS-A derived from means based on max scores suggests that parents of referred children have a strongly negatively biased view of their child, while the parents of non-referred children are mildly to strongly positively biased. The validity studies showed that it is uncertain what the EDS-A measures, and until further research has been conducted the structured assessment/interview can only be used as a clinical instrument.

Despite the differences between the measurement tools, the empirical study revealed correlations between the level of the child's emotional functions, the parents' level of mentalizing and their intersubjectivity, although the findings were less straightforward than expected.

The results of the empirical study are promising, especially regarding the EDS-P. This study suggests that the EDS seems to offer a consistent measure of the emotional competencies and vulnerabilities of 4–12-year-olds and is suited for determining their emotional developmental age, although more research is needed.

# REFERENCES

Abidin, R. (1995). *Parenting Stress Index. Professional manual.* Lutz, FL: Psychological Assessment Resources.

Ainsworth, M. D. S., Blehar, M. C., Waters, E. & Wall, P. (1978). *Patterns of Attachment: A Psychological Study of the Strange Situation*. Hillsdale, NJ: Lawrence Erlbaum.

Aitken, K. J. & Trevarthen, C. (1997). Self-other organization in human psychological development. *Development and Psychopathology, 9*, 653–678.

Allen, J.G., Fonagy, P. & Bateman, A.W. (2008). *Mentalizing in Clinical Practice.* Washington, DC: American Psychiatric Publishing Inc.

Amadei, G. & Bianchi, I. (Eds.) (2008). *Living Systems, Evolving Consciousness, and the Emerging Person*. *A Selection of Papers from the Life Work of Louis Sander*. New York, NY: The Analytic Press. Taylor & Francis Group.

Bakermans-Kranenburg, M. J. & van Ijzendoorn, M. H. (2007). Research review: genetic vulnerability or differential susceptibility in child development: the case of attachment. *J. Child Psychology and Psychiatry, 48*(12), 1160–1173. DOI.ORG/10.1111/J.1469-7610.2007.01801.X.

Barfield, S., Dobson, C., Gaskill, R. & Perry, B. D. (2011). Neurosequential model of therapeutics in a therapeutic preschool: implications for work with children with complex neuropsychiatric problems. *International Journal of Play Therapy.* Advance online publication. doi: 10.1037/a0025955.

Barfield,S., Dobson,C., Gaskill,R. & Perry, B. (2014). Neurosequential model of therapeutic in a therapeutic preschool: Implications for work with children with complex neuropsychiatric problems. *The Advanced Generalist: Social Work Research Journal, 1*(2), 64–80.

Baron-Cohen, S. (2003). *Male and Female Brains and the Truth About Autism – The Essential Difference.* New York, NY: Basic Books.

Bartels, A. & Zeki, S. (2004). The neural correlates of maternal and romantic love. *NeuroImage, 21*(3), s. 1155–1166. DOI:10.1016/j.neuroimage.2003.11.003.

Bateman, A. W. & Fonagy, P. (2012). Preface. In A. W. Bateman & P. Fonagy (Eds.), *Handbook of Mentalizing in Mental Health Practice* (pp. xv–xxi). Arlington, VA: American Psychiatric Publishing, Inc.

Beebe, B. & Lachmann, F.M. (2002). *Infant Research and Adult Treatment. Co-Constructing Interactions.* Hillsdale, NJ & London: The Analytic Press.

Beeghly, M., Perry, B. D. & Tronick, E. (2016). Self-regulatory processes in early development. In S. Maltzman (Ed.), *The Oxford Handbook of Treatment Processes and Outcomes in Psychology*. New York, NY: Oxford University Press.

Bentzen, M. & Hart, S. (2015). *Through Windows of Opportunity – A Neuroaffective*

*Approach to Child Psychotherapy*. London: Karnac.
Bentzen, M. & Hart, S. (2017). Mentaliseringstrekanten – En neuroaffektiv arbejdsmodel. [The mentalizing triangle – a neuroaffective working model] *Tidsskrift for Psykoterapi*, *3*, 8–14.
Bernier, A., Matte-Gagné, C., Bélange, M. E. & Whipple, N. (2014). Taking stock of two decades of attachment transmission gap: broadening the assessment of maternal behavior. *Child Development, 85*(5), 1852–1865. doi.org/10.1111/cdev.12236.
Booth, P. B. & Jernberg, A.M. (2010). *Theraplay – Helping Parents and Children Build Better Relationships Through Attachment-Based Play* (3rd edition). San Francisco, CA: Jossey-Bass.
Booth, P. B., Christensen, G. & Lindaman, S. (2011). *Marschak Interaction Method, Pre-School/School Age, Prenatal, Infant, Toddler, Adolescent Manual.* Evanston, IL: The Theraplay Institute.
Bowlby, J. (1969). Attachment and loss: Vol. 1. Attachment. New York: Basic Books.
Bowlby, J. (1973). Attachment and loss: Vol. 2. Separation: Anxiety and anger. New York: Basic Books.
Brace, N., Kemp, R. & Snelgar, R. (2006). *SPSS for psychologists.* New York, NY: Palgrave MacMillan.
Brannon, L. (2017). *Gender – Psychological Perspectives* (7th edition). New York, NY: Routledge.
Brinkman, S. (2015). Etik i en kvalitativ verden [Ethics in a qualitative world]. In S. Brinkman & L. Tanggaard (Eds.), *Kvalitative Metoder* [Qualitative Methods] (pp. 463–479). Copenhagen: Hans Reitzels Forlag.
Brinkmann, S. & Tanggaard, L. (2015). Kvalitative metoder, tilgange og perspektiver: En introduktion. [Qualitative methods, approaches and perspectives: An introduction] In S. Brinkman & L. Tanggaard (Eds.), *Kvalitative Metoder* [Qualitative Methods], (pp. 13–24). Copenhagen: Hans Reitzels Forlag.
Budd, K. S., Poindexter, L. M., Felix, E.D. & Naik-Polan, A. T. (2001). Clinical assessment of parents in child protection cases: An empirical analysis. *Law and Human Behavior, 25,* 93–108. DOI: 10.1023/A:1005696026973.
Cameron, O. G. (2001). Interoception: The inside story – a model for psychosomatic processes. *Psychosomatic Medicine, 63*(5), 697–710.
Carr, A. (2006). *Handbook of Clinical Child and Adolescent Psychology*. London: Routledge.
Choudhury, S. (2010). Culturing the adolescent brain: What can neuroscience learn from anthropology? *Social Cognitive Affect Neuroscience, 5*(2–3), 159–167. doi: 10.1093/scan/nsp030.
Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment, 6*(4), 284–290. http://dx.doi.org/10.1037/1040-3590.6.4.284.

Cicchetti, D. (2015). Neural plasticity, sensitive periods, and psychopathology. *Development and Psychopathology, 27,* 319–320. doi: 10.1017/S0954579415000012.

Cicchetti, D. (2016). Socioemotional, personality, and biological development: illustrations from a multilevel developmental psychopathology perspective on child maltreatment. *Ann. Review Psychology*. *67*, 187–211. doi: 10.1146/annurev-psych-122414-033259.

Cicchetti, D. & Curtis, J. (2006). The developing brain and neural plasticity: Implications for normality, psychopathology, and resilience. In D. Cicchetti, D.J. Cohen (Eds..), *Developmental Psychopathology, Vol 2: Developmental Neuroscience* (pp. 1–65). New York, NY: Wiley.

Colegrove, V. M. & Havighurst, S. S. (2016). Review of nonverbal communication in parent-child relationships: Assessment and intervention. *Journal Child and Family Studies.* 26(2), 574-590. doi: 10.1007/s10826-016-0563-x.

Coolican, H. (2014). *Research Methods and Statistics in Psychology* (6th edition). New York, NY: Psychology Press.

Cozolino, L. (2014). *The Neuroscience of Human Relationships – Attachment and the Developing Social Brain.* New York, NY: W.W. Norton & Co. Inc.

Crittenden, P. (2016). *Raising Parents.* New York, NY: Routledge

Damasio, A. R. (1998). *The Feeling of What Happens.* New York, NY: Harcourt Brace.

Daniel, S. & Trevarthen, C. (2017). *Rhythms of Relating in Children's Therapies.* London: Jessica Kingsley Publishers.

Danske Regioner [Danish Regions] (2017). *Benchmarking af Psykiatrien* [Benchmarking of Psychiatric Services]. Retrieved from http://www.regioner.dk/sundhed/psykiatri-og-social/benchmarking-af-psykiatrien. Retrieved on 28 January 2018.

David, D. H. & Lyons-Ruth, K. (2005). Differential attachment responses of male and female infants to frightening maternal behavior: Tend or befriend versus fight or flight? *Infant Mental Health Journal, 26*(1), 1–18.

Decety, J. (2005). Perspective taking as the royal avenue to empathy. In B. F. Malle & S. D. Hodges (Eds*.), Other Minds: How Humans Bridge the Divide between Self and Others* (pp. 135–149). New York, NY: Guilford Press.

Decety, J. & Meyer, M. (2008). From emotional resonance to empathic understanding: A social developmental neuroscience account. *Development and Psychopathology, 20*(4), 1053–1080. doi: 10.1017/S0954579408000503.

Dileo, C. (2005). Reviewing the literature. In Wheeler, B. (2005) (Ed.), *Music Therapy Research* (2nd edition). Gilsum: Barcelona Publishers.

Eysenck, H.J. (2017). *Intelligence: A New Look.* New York, NY: Routledge.

Farber, B. A. (1985). The genesis, development, and implications of psychological-mindedness in psychotherapists. *Psychotherapy*, *22*(2), 170–177.

Fleiss, J. L. (1981). Balanced incomplete block designs for inter-rater reliability studies. *App. Psychological Measurement*, *5*(1), 105–112.

Fonagy, P. (2001). The human genome and the representational world: The role of early mother-infant interaction in creating an interpersonal interpretive mechanism. Cognitive and interactional foundations of attachment. *Bulletin of the Menninger Clinic, 65*(3), 427–448. https://doi.org/10.1521/bumc.65.3.427.19844.

Fonagy, P. (2009). The mentalization approach to social development. In F. Busch (Ed.) *Mentalization: Theoretical Considerations, Research Findings, and Clinical Implications*. New York, NY: Analytic Press.

Fonagy, P., Steele, M., Steele, H., Moran, G. S. & Higgitt, A. (1991). The capacity for understanding mental states: The reflective self in parent and child and its significance for security of attachment. *Infant Mental Health Journal, 12*(3), 201–218.

Fonagy, P., Steele, M., Moran, G., Steele, H. & Higgitt, A. (1993). Measuring the ghost in the nursery: An empirical study of the relation between parents' mental representations of childhood experiences and their infants' security of attachment. *Journal of the American Psychoanalytic Association, 41*:997.

Fonagy, P., Steele, M., Steele, H., Leigh, T., Kennedy, R., Mattoon, G. & Target, M. (1995). The predictive validity of Mary Main's Adult Attachment Interview: A psychoanalytic and developmental perspective on the transgenerational transmission of attachment and borderline states. In S. Goldberg, R. Muir & J. Kerr (Eds.), *Attachment Theory: Social, Developmental and Clinical Perspectives* (pp. 233–278). Hillsdale, NJ: The Analytic Press.

Fonagy, P., Leigh, T., Steele, M., Steele, H., Kennedy, R., Mattoon, G., Gerber, A. (1996). The relation of attachment status, psychiatric classification, and response to psychotherapy. *Journal of Consulting & Clinical Psychology, 64*: 22–31.

Fonagy, P., Target, M., Steele, H. & Steele, M. (1998). *Reflective-Functioning Manual: Version 5 for Application to Adult Attachment Interviews.* Unpublished manual. London: University College.

Fonagy, P., Gergely, G., Jurist, E. L. & Target, M. (2002). *Affect Regulation, Mentalization and the Development of the Self.* New York, NY: Other Press.

Fonagy, P., Gergely, G., Jurist, E. L. & Target, M. (2007). The parent-infant dyad and the construction of the subjective self. *Journal of Child Psychol. Psychiatry 48*: 288–328.

Fonagy, P. & Ghinai, R. A. (2008). *A Self-Report Measure of Mentalizing Development and Preliminary Test of Reliability and Validity of the Reflective Function Questionnaire (RFQ).* Unpublished manuscript. London: University College.

Fonagy, P., Bateman, A. & Luyten, P. (2012). Introduction and overview. In A. Bateman & P. Fonagy (Eds.), *Handbook of Mentalizing in Mental Health Practice* (pp. 3–41). Arlington, VA: American Psychiatric Publishing, Inc.

Furr, M. (2016). *Scale Construction and Psychometrics for Social and Personality Psychology*. London: SAGE Publications Ltd.

Gabbard, G. O. (2001). A contemporary psychoanalytic model of countertransference. *J. Clinical Psychology. 57*(8), 983–991.

Gerard, A. (2005). *Parent-Child Relationship Inventory (PCRI): Manual.* Los Angeles, CA: Western Psychological Services.

Grijalva, E., Newman, D. A., Tay, L., Donnellan, M. B., Harms, P. D., Robins, R. W. & Yan, T. (2015). Gender differences in narcissism: A meta-analytic review. *Psychological Bulletin, 141*(2), 261–310. doi.org/10.1037/a0038231.

Guilford, J.P. (1956). *Fundamental Statistics in Psychology and Education*. New York, NY: McGraw-Hill Book Co.

Gunderson, J. G. & Lyons-Ruth, K. (2008). BPD's interpersonal hypersensitivity phenotype: A gene-environment-developmental model. *J. Personality Disorders*, *22*(1), 22–41.

Gustman, B. D. (2015). *An Examination of the Psychometric Properties of the Working Model of the Child Interview Coding Scheme with Biological Mothers Who Have Maltreated.* Doctoral Dissertation. Lexington, Kentucky: University of Kentucky.

Ha, C., Sharp, C., Ensink, K., Fonagy, P., Cirino, P. (2013). The measurement of reflective functioning in adolescents with and without borderline traits. *Journal of Adolescence*, *36*(6), 1215–1223. doi.org/10.1016/j.adolescence.2013.09.008.

Hanna, D. & Demster, M. (2012). *Psychology Statistics for Dummies.* Chichester, NJ: John Wiley & Sons Ltd.

Hart, S. (2008). *Brain, Attachment, Personality. An Introduction to Neuroaffective Development.* London: Karnac

Hart, S. (2011a). *The Impact of Attachment. Developmental Neuroaffective Psychology.* New York, NY: Norton & Co.

Hart, S. (Ed.). (2011b). *Neuroaffektiv Psykoterapi med Børn.* [*Neuroaffective Psychotherapy with Children*]. Copenhagen: Hans Reitzels Forlag.

Hart, S. (Ed.). (2012). *Neuroaffektiv Psykoterapi med Voksne.* [*Neuroaffective Psychotherapy with Adults*]. Copenhagen: Hans Reitzels Forlag.

Hart, S. (2016a). (Ed.) *Inclusion, Play and Empathy – Neuroaffective Development in Children Groups.* London: Jessica Kingsley Publishers.

Hart, S. (2016b). Fra nevroaffektiv utviklingspsykologi til nevroaffektiv psykoterapi med barn og familier. [From neuroaffective developmental psychology to neuroaffective psychotherapy with children and families]. In H. Haavind & H. Øvreeide (Eds.), *Barn og Unge i Psykoterapi* [Children and Youth in Psychotheray], (2nd edition). Oslo: Gyldendal Norsk Forlag.

Hart, S. (2016c). Trauma, attachment and Neuroaffective Developmental Psychology. In M. Jäckle, B. Wuttig, C. Fuchs (Eds.), *Handbuch Trauma Pädagogik und Schule*. Bielefeld: Transcript.

Hart, S. (2016d). *Makro- og Mikroregulering*. [Macro- and Macro Regulation]. Copenhagen: Hans Reitzels Forlag.
Hart, S. & Schwartz, R. (2008). *Fra Interaktion til Relation: Tilknytning hos Winicott, Bowlby, Stern, Schore & Fonagy.* [From Interaction to Relationship: Attachment with Winnicott, Bowlby, Stern, Schore & Fonagy]. Copenhagen: Hans Reitzels Forlag.
Hart. S. & Birck, J. (2018). Advancing our knowledge on the neurodevelopment of emotions, and the inter-relationship between the Neurosequential Model of Therapeutics (NMT) and the Emotional Development Scale. In E. T. Perry, G. Griffin, M. Maikoetter, S. Graner, J. L. Rosenfelt & B. D. Perry (Eds.), *Proceedings of the 2nd International Neurosequential Model Symposium*. Banff, Canada: The ChildTrauma Academy, childtrauma.org.
Birck, J., Hart, S. & Hellborn, K. (2016). *The Emotional Development Scale (EDS) Manual*. Unpublished Manuscript.
Hayes, J. A., Gelso, C. J. & Hummel, A.M. (2011). Managing countertransference. *Psychotherapy, 48*(1), 88–97. doi: 10.1037/a0022182.
Heinze, M. & Grisso, T. (1996). Review of instruments assessing parenting competencies used in child custody evaluations. *Behavioral Sciences and the Law, 14*, 293–313.
Hollon S. D. & Beck A.T. (2013). Cognitive and cognitive-behavioral therapies. In M.J. Lambert (Ed.). *Bergin and Garfield's Handbook of Psychotherapy and Behavior Change* (6th edition), (pp. 393–394). Hoboken, NJ: John Wiley & Sons.
Howell, D. C. (2013). *Statistical Methods for Psychology* (8th edition). Belmont, CA: Wadworth.
Huang, C. Y., Costeines, J. Kaufman, J. S. & Ayala, C. (2014). Parenting stress, social support, and depression for ethnic minority adolescent mothers: Impact on child development. *J. of Child and Family Studies, 23*(1), 255–262.
Inzlicht, M., Bartholow B. D. & Hirsh, J.B. (2015). Emotional foundations of cognitive control. *Trends Cognitive Science, 19*(3), 126–132. doi: 10.1016/j.tics.2015.01.004.
Jackson, J. H. (1958). *Selected Writings of John Hughlings Jackson. Volume One: On Epilepsy and Epileptiform Convulsions; Volume Two: Evolution and Dissolution of the Nervous System, Speech, Various Papers, Addresses and Lectures*. New York, NY: Basic Books, Inc.
Jacobsen, S. L. (2012). *Music Therapy Assessment and Development of Parental Competencies in Families Where Children Have Experienced Emotional Neglect.* Doctoral Dissertation. Aalborg: Aalborg University.
Jacobsen, S. L. & McKinney, C. H. (2015). A music therapy tool for assessing parent-child interaction in cases of emotional neglect. *Journal of Child and Family Studies,* 24(7), 2164-2173. DOI 10.1007/s10826-014-0019-0.
Jacobsen, S. L. & Holck, U. (2016). Inclusion, children groups, music therapy – music and communicative musicality. In S. Hart (Ed.). *Inclusion, Play*

*and Empathy – Neuroaffective Development in Children Groups.* London: Jessica Kingsley Publishers.

Jacobsen, S. L., Waldon, E., Gattino, G. (2018). Music Therapy Assessment: Theory, Research, and Application. Jessica Kingsley Publishers, London: UK.

James, W. (1992). *Writings 1878–1899. Psychology, Briefer Course/ The Will to Believe/Talks to Teachers and Students/Essays.* New York, NY: The Library of America.

Johnson, R. B. & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33*(7), 14–26. doi: jstor.org/stable/3700093.

Johnson, R. B. & Onwuegbuzie, A. J. (2007). Toward a definition of mixed methods research. *J. Mixed Methods Research*.1(2), 112–133. doi.org/10.1177/1558689806298224.

Jørgensen, C. R. (2012). *Danmark på Briksen – Et Psykologisk Perspektiv på Danmark og Danskerne i det Senmoderne Samfund*. [Denmark on the Examination Couch – A Psychological Perspective on Denmark and Danish Late Modern Society]. Copenhagen: Hans Reitzels Forlag.

Kagan J. (1998). Biology and the child. In Damon W, Eisenberg N (Eds.). *Handbook of Child Psychology: Vol. 3. Social, Emotional and Personality Development* (5th edition), 177–235. New York, NY: Wiley.

Karpatschof, B. (2011). Psykisk målbarhed. [Mental measurability]. In B. Karpatschof & B. Katzenelson (Eds.), *Klassisk og Moderne Psykologisk Teori*. Copenhagen: Hans Reitzels Forlag.

Karr-Morse, R. & Wiley, M. (1997). *Ghosts from the Nursery. Tracing the Roots of Violence.* New York, NY: The Atlantic Monthly Press.

Katznelson, H. (2015). *Mentalizing in Pychotherapy – A Clinical Study of the Role of Reflective Functioning in the Treatment of Bulimia Nervosa.* PhD Thesis. Copenhagen: University of Copenhagen.

Kennedy, H. (1979). The role of insight in child analysis: A developmental viewpoint. *Journal of the American Psychoanalytic Association, 27*(Suppl.), 9–28.

Kernberg, O. (1965). The concept of countertransference. *J. American Psychoanal. Assoc*., *13*, 38–56. doi: 10.1177/000306516501300102.

Kline, P. (1986). *A Handbook of Test Construction – Introduction to Psychometric Design.* New York, NY: Routledge.

Levinson, *D. J.*, Sharaf, M. R. & Gilbert, D. C. (1966). Intraception: Evaluation of a concept. In G. J. DiRenzo (Ed.), *Concepts, Theory and Explanation in the Behavioral Sciences*, 116–135. New York, NY: Random House.

Lilienfeld, S. O., Wood, J. M. & Garb, H. N. (2000). The scientific status of projective techniques. *Psychological Science Public Interest, 1*(2) 27–65. doi: 10.1111/1529-1006.002.

Lindvang, C. & Beck, B. D. (2017). *Musik, Krop og Følelser* [Music, Body and Emotions]. Copenhagen: Frydenlund Academic.
Luquet, P. (1981) Le changement dans la mentalization. [Change in mentalization]. *Revue Francais de Psychoanalyse, 45*, 1023–1028.
Lutchmaya, S. & Baron-Cohen, S. (2002). Human sex differences in social and non-social looking preferences, at 12 months of age. *Infant Behavior and Development*, *25*(3), 319–325. DOI.org/ 10.1016/S0163-6383(02)00095-4.
Lutchmaya, S., Baron-Cohen, S. & Raggatt, P. (2002). Foetal testosterone and eye contact in 12-month old human infants. *Infant Behavior & Development, 25*, 327–335.
Mackinnon, L. (2012). The Neurosequential Model of Therapeutics: An interview with Bruce Perry. *Trauma and Systemic Therapy*, *33*(3), 210–218. doi.org/10.1017/aft.2012.26.
MacLean, P. D. (1970). The triune brain, emotion, and scientific bias. In F. O. Schmitt (Ed.). *The Neurosciences Second Study Program* (pp. 336–349). New York, NY: The Rockefeller University Press.
MacLean, P. D. (1990). *The Triune Brain in Evolution: Role in Paleocerebral Functions.* New York, NY: Plenum Press.
Mead, G. H. (2015). *Mind, Self and Society*. (First edition 1934). Chicago, IL: The University of Chicago Press.
Meltzoff, A. N. (2007). The 'like me' framework for recognizing and becoming an intentional agent. *Acta Psychologica*, 124, 26–43.
Meltzoff, A. N. (2013). Origins of social cognition: Bidirectional self-other mapping and the 'like-me" hypothesis. In M. R. Banaji & S. A. Gelman (Eds.), *Oxford Series in Social Cognition and Social Neuroscience. Navigating the Social World: What Infants, Children, and Other Species Can Teach Us* (pp. 139–144). New York, NY, US: Oxford University Press. doi.org/10.1093/acprof.
Menna, R. & Cohen, N.J. (1997). Social perspective taking. In M. McCallum & W. E. Piper (Eds.), *Psychological Mindedness: A Contemporary Understanding*, pp. 189–210. Munich: Lawrence Erlbaum Associates.
Michael, R. P. & Zumpe, D. (1998). Developmental changes in behavior and in steroid uptake by the male and female macaque brain. *Developmental Neuropsychology*, *14*(2–3), 233–260.
Michell, J. (2003). The qualitative imperative – positivism, naive realism, and the place of qualitative methods in psychology. *Theory & Psychology*, *13*(1), 5–31. doi/10.1177/0959354303013001758.
Miljkovitch, R., Pierrehumbert, B., Bretherton, I. & Haldon, O. (2004). Associations between parental and child attachment representations. *Attachment & Human Development. 6*(3), 305–325.
Moll, H. & Meltzoff, A. N. (2011a). Perspective-taking and its foundation in joint attention. In N. Eilan, H. Lerman & J. Roessler (Eds.), *Perception,*

*Causation, and Objectivity. Issues in Philosophy and Psychology* (pp. 286–304. Oxford: Oxford University Press.

Moll, H. & Meltzoff, A. N. (2011b). Joint Attention as the fundamental basis of understanding perspectives. In A. Seemann (Ed.), *Joint Attention: New Developments in Psychology, Philosophy of Mind, and Social Neuroscience* (pp. 392–412). Cambridge, MA: MIT Press.

Möricke, E., Buitelaar, J. K. & Rommelse, N. N. (2016). Do we need multiple informants when assessing autistic traits? The degree of report bias on offspring, self, and spouse ratings. *J. Autism Developmental Disorders, 46*(1), 164–175. doi.org/10.1007/s1080.

Murray, H. A. (1938). *Explorations in Personality.* New York, NY: Oxford University Press.

Newton, P. E. & Shaw, S. D. (2013). Standards for talking and thinking about validity. *Psychol. Methods*. *18*(3), 301–19. doi: 10.1037/a0032969.

Nickels, N., Kubicki, K. & Maestripieri, D. (2017). Sex differences in the effects of psychosocial stress on cooperative and prosocial behavior: evidence for 'flight or fight' in males and 'tend and befriend' in females. *Adaptive Human Behavior and Physiology*, *3*(2), 171–183. doi: 10.1007/s40750-017-0062-3.

Nunnally, J. C. (1978). *Psychometric Theory*, New York: McGraw-Hill.

Nunnally, J. C. & Bernstein, I. H. (1994). *Psychometric theory* (3rd edition). New York, NY: McGraw-Hill, Inc.

Olsen-Kludt, M. (2013). Den tilknytningsbaserede kliniske undersøgelse. Marshak Interaction Method. [Attachment Based Clinical Assessment. Marschak Interaction Method.] In R. Schwartz & S. Hart (Eds.) *Barnet og Dets Relationelle Miljø.* Copenhagen: Hans Reitzels Forlag.

Oosterwegel, A. & Oppenheimer, L. (1993). Development of the self-system: How children perceive their own and others' ideas about themselves. *Journal of Applied Developmental Psychology, 14*(4), 443–460. doi.org/10.1016/0193-3973(93)90001-C.

Panksepp, J. & Trevarthen, C. (2009). The Neuroscience of Emotion in Music. In S. Malloch and C. Trevarthen (Eds.), *Communicative Musicality: Exploring the Basis of Human Companionship*. (pp. 105–146). Oxford: Oxford University Press.

Perry, B. D. (2001). Violence and childhood: How persisting fear can alter the developing child's brain. Cybrary version from the neurodevelopmental impact of violence in childhood. In D. Schetky & E. Benedek (Eds.), *Textbook of Child Adolescent Forensic Psychiatry* (pp. 221–238). Washington, DC: American Psychiatric Press.

Perry, B. D. (2002). Childhood experience and the expression of genetic potential: What childhood neglect tells us about nature and nurture. *Brain and Mind, 3*, 79–100.

Perry, B. D. (2006). Applying principles of neurodevelopment to clinical work with maltreated and traumatized children: The Neurosequential Model of

Therapeutics. In Webb: *Working with Traumatized Youth in Child Welfare* (pp. 27–52). New York, NY: The Guilford Press.
Perry, B. D. (2009). Examining child maltreatment through a neurodevelopmental lens: Clinical applications of the Neurosequential Model of Therapeutics. *Journal of Loss and Trauma*, *15*, 240–255.
Perry, B. D. (2014). The Neurosequential Model of Therapeutics: Application of a developmentally sensitive and neurobiology-informed approach to clinical problem solving in maltreated children. In K. Brandt, B. D. Perry, S. Seligman & E. Tronick (Eds.), *Infant and Early Childhood Mental Health. Core concepts and Clinical Practice* (pp. 21–32). Washington, DC: American Psychiatric Publishing.
Perry, B. D. & Hambrick, E. (2008). The Neurosequential Model of Therapeutics. *Reclaiming Children and Youth*, *17*(3), 38–43.
Perry, B. D. & Dobson, C. (2013). The Neurosequential Model (NMT) in maltreated children. In J. Ford & C. Courtois (Eds.) *Treating Complex Traumatic Stress Disorders in Children and Adolescents* (pp. 249–260). New York, NY: Guilford Press.
Perry, B. D., Wang, E., Maikoetter, M., O'Malley, D., Strother, M., Griffin, E. & Mackenzie, J. (2016). *Positive Impact of the Neurosequential Model of Therapeutics (NMT) on Restraints and Critical Incidents in Residential Care Settings: A Multi-Site, Multi-Year Report*. Houston, TX: Child Trauma Academy.
Phillips, D. C. & Burbules, N. C. (2000). *Post-Positivism and Educational Research*. Oxford: Rowman & Littlefield Publishers, Inc.
Piaget, J. (1965). *The Moral Judgment of the Child.* Glencoe, IL: Free Press.
Porges, S. W. (2011). *The Polyvagal Theory: Neurophysiological Foundations of Emotions, Attachment, Communication, and Self- Regulation Contributions to Social Behaviour*. New York, NY: Norton & Co.
Poulsen, S. & Simonsen, E. (2017). Psykiatrisk og klinisk psykologisk assessment. [Psychiatric and clinical psychological assessment]. In B. Møhl & E. Simonsen (Eds.) *Grundbog i psykiatri* [Basic Reader Primer in Psychiatry] (pp. 165–191). Copenhagen: Hans Reitzels Forlag.
Rieper, C. G. (2013). Hvad er et systematisk review, og hvilke formål tjener den? [What is a systematic review, and what purpose does it serve?]. In C. G. Johannesen & N. O. Pors (Eds.). *Evidens og Systematiske Reviews – en Introduktion* [Evidence and Systematic Reviews]. Copenhagen: Samfundslitteratur.
Roberts, P., Priest, H. & Traynor, M. (2006). Reliability and Validity in Research. *Nursing Standard*, 20(44), p. 41-45
Robson, C. (2011). *Real World Research* (3rd Edition). Chichester: Wiley.
Robson, C. & McCartan, K. (2016). *Real World Research – A Resource for Users of Social Research Methods in Applied Settings* (4th Edition). London: Wiley & Sons Ltd.
Rosenblum, K., Mcdonough, S., Sameroff, A.J. & Muzik, M. (2008). Reflection in thought and action: Maternal parenting reflectivity predicts mind-minded

comments and interactive behavior. *Infant Mental Health Journal, 29*(4), 362–376. doi: 10.10002/imhj.20184

Rosenthal, R. Rosnow, R.L. (2009). *Artifacts in Behavioral Research - Experimenter Effects in Behavorial Research and the Volunteer Subject*. New York, NY: Oxford University Press

Ruigrok, A.N.V., Salimi-Khorshidi, G., Meng-Chuan, L., Baron-Cohen, S., Lombardo, M.V., Tait, R.J. & Suckling, J. (2014) A meta-analysis of sex differences in human brain structure. *Neuroscience and Biobehavioral Reviews, 39*, 34–50. doi.org/10.1016/j.neubiorev.2013.12.004.

Rutter, M. & Sroufe, L.A (1997). Developmental psychopathology: concepts and challenges. *Developmental Psychopathology, 12*(3), 265–296. PMID:11014739.

Rutter, M. & Sroufe, A.L. (2000). Development and Psychopathology: Concepts and challenges. *Development and Psychopathology*, *12*, 265–296.

Rybanska, V., McKay, R. & Jong, J. & Whithouse, H. (2017). Rituals improve children's ability to delay gratification. *Child Development, 89*(2), 349–359. https://doi.org/10.1111/cdev.12762.

Sameroff, A. (Ed.) (2009). *The Transactional Model of Development: How Children and Contexts Shape Each Other*. Washington, DC: American Psychological Association.

Schore, A. N. (2016). *Affect Regulation and the Origin of the Self*. New York, NY: Routledge.

Schwartz, R. (2011). *Den Psykologiske Undersøgelse af Børn.* [The Psychological Assessment of Children]. Copenhagen: Hans Reitzels Forlag.

Schwartz, R. & Hart, S. (2013). *Barnet og Dets Relationelle Miljø* [The Child and Its Relational Environment]. Copenhagen: Hans Reitzels Forlag.

Selman, R. L. (1980). *The Growth of Interpersonal Understanding*. New York, NY: Academic Press.

Selman, R. L., Beardslee, W., Schultz, L. H., Krupa, M. & Podorefsky, D. (1986). Assessing adolescent interpersonal negotiation strategies: toward the integration of structural and functional models. *Developmental Psychology*, *22*, 450–459.

Siegel, D. J. (2012). *The Developing Mind – How Relationships and the Brain Interact to Shape Who We Are* (2nd edition). New York, NY: The Guilford Press.

Slade, A., J. Grienenberger, E. Bernbach, D. Levy & A. Locker (2005). Maternal reflective functioning, attachment, and the transmission gap: A preliminary study. *Attachment & Human Development, 7*(3), 283–298.

Sleed, M. (2013). *The Assessment of Relational Risk in Early Parent-Infant Relationships*. Doctoral thesis. London: University College London.

Snyder, H. R., Miyake, A. & Hankin, B. L. (2015). Advancing understanding of executive function impairments and psychopathology: bridging the gap between clinical and cognitive approaches. *Frontiers Psychology, 26*(6), 328. doi: 10.3389/fpsyg.2015.00328.

Solms, M. & Turnbull, O. (2002). *The Brain and the Inner World.* New York, NY: Other Press.
Sroufe, L. A. (2005). Attachment and development: A prospective, longitudinal study from birth to adulthood, *Attachment and Human Development, 7,* 349-367.
Sroufe, L. A., Egeland, B., Carlson, E. & Collins, W. A. (2005). *The Development of the Person: The Minnesota Study of Risk and Adaptation from Birth to Adulthood*. New York, NY: Guilford Publications.
Standards for Educational and Psychological Testing (2014). Washington DC: American Educational Research Ass. & National Council on Measurement in Education.
Stenstrup, C. (2013). *Preschool Children's Mental Representations of Attachment: Links to Prenatal Attachment and Stressful Life-Events – A Danish Explorative Follow-Up Study*. PhD Thesis. Copenhagen: University of Copenhagen.
Stern, D. N. (1995). *The Motherhood Constellation.* New York, NY: Basic Books.
Stern, D. N. (2000). *The Interpersonal World of the Infant* (2nd edition). New York, NY: Basic Books.
Stern, D. N. (2004) *The Present Moment in Psychotherapy and Everyday Life*. New York & London: W. W. Norton & Company.
Tannen, D. (1990). *You Just Don't Understand – Women and Men in Conversation.* London: Virago Press.
Trevarthen, C. (1998). The concept and foundations of infant intersubjectivity. In S. Bråten (Ed.) Intersubjective Communication and Emotion in Early Ontogeny (pp. 15-47). Cambridge UK: Cambridge University Press.
Trevarthen, C. (2001). The neurobiology of early communication: intersubjective regulations in human brain development. In A.F. Kalverboer & A, Gramsbergen (Eds.) *Handbook of Brain and Behaviour in Human Development* (pp. 841–881). Dordrecht: Kluwer Academic Publishers.
Trevarthen, C. (2005). Stepping away from the mirror: Adventures of companionship. reflections on the nature and emotional needs of infant intersubjectivity. In C. S. Carter, L. Ahnert, K. E. Grossman, S. B. Hrdy, M. E. Lamb, S. W. Porges & N. Sachser (Eds.) *Attachment and Bonding: A New Synthesis* (pp. 55-84). Dahlem Workshop Report 92. Cambridge, MA: The MIT Press.
Trevarthen, C. (2017). Health and happiness grow in play. In S. Daniel & C. Trevarthen (Eds.). *Rhythms of Relating in Children's Therapies – Connecting Creatively with Vulnerable Children*. London: Jessica Kingsley Publishers.
Trevarthen, C & Panksepp, J (2016). In tune with feeling: Musical play with emotions of creativity, inspiring neuroaffective development and self-confidence for learning in company. In Hart, S. (2016a) (Ed.) *Inclusion, Play and Empathy – Neuroaffective Development in Children Groups*. London: Jessica Kingsley Publishers.
Trochim, W. M. (2006). *The Research Methods Knowledge Base* (2nd edition).

Retrieved from http://www.socialresearchmethods.net/kb/measure.php.

U.S. Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2010). *Child Maltreatment 2009.* Retrieved from: http://www.acf.hhs.gov/programs/cb/stats_research/index.htm#can.

van der Kolk, B. (2014). *The Body Keeps the Score*. New York, NY: VIKING Penguin Group.

Varela, F. J., Thomson, E. & Rosch, E. (2016). *The Embodied Mind – Cognitive Science and Human Experience* (revised Edition). Cambridge, Massachusetts: The MIT Press.

Vaz, S., Falkmer, T., Passmore, A. E., Parsons, R. Andreou, P. (2013). The case for using the repeatability coefficient when calculating test-retest reliability. *PloS One 8*(9) e73990. doi:10.1371/journal.pone.0073990.

Verhage, M. L., Schuengel, C., Madigan, S., Fearon, R.M.P., Oosterman, M., Cassibba, R., Bakermans-Kranenburg, M. J., van IJzendoorn, M. H. (2016). Narrowing the transmission gap: A synthesis of three decades of research on intergenerational transmission of attachment. *Psychological Bulletin*, *142*(4), 337-366. doi: 10.1037/bul0000038.

Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes.* Cambridge, MA: Harvard University Press.

Winnicott, D. W. (1960). Counter-transference. *British J. Med. Psychology*., 33(1), 17-21. doi.org/10.1111/j.2044-8341.1960.tb01220.x

Wolstein, B. (Ed.) (1988). *Essential Papers on Countertransference.* New York, NY: New York University Press.

Zhou, Q., Eisenberg, N., Losoya, S. H., Fabes, R. A., Reiser, M., Guthrie, I. K., Murphy, B. C., Cumberland, A. J. & Shepard, S. A. (2002). The relations of parental warmth and positive expressiveness to children's empathy-related responding and social functioning: A longitudinal study. *Child Development, 73*(3), 893–915. PMID:12038559.

# APPENDIX A: PAPER 1

## The neuroaffective triangle and organizing intervention in family- and psychotherapy - A new conceptual framework for family therapy

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**Abstract**
This article outlines a conceptual framework for organizing family therapy based on an integrative coherent theory called Neuroaffective Developmental Psychology (NADP) (XXX 2008; 2011). NADP is an integration of attachment theory, neuropsychology, developmental psychology and trauma theory. It has been developed as a tool to understand and navigate in the complex world of emotional development, intersubjectivity, family therapy and psychotherapy to create relevant intervention plans as the approach can adjust to meet the needs of each individual family or client. The aim of NADP is a) to understand emotional development, personality vulnerabilities and disorders and the maturation of emotional capacities within attachment-based relationships and b) to translate this understanding into relevant intervention plans that can be discretely adjusted to the complexity of human development and the skills and agency of the professionals working with the families. This article aims to present the theory of NADP and its clinical application within a family therapy setting illustrated by a family case, where the principles for assessment and intervention are reviewed and discussed.

**Compliance with Ethical Standards**
**Conflict of Interest** The authors declare that they have no competing interests.
**Consent** As the case report employed in this article is fabricated, no consent was obtained.
**Keywords:** emotional development; integrative personality theory; neuroaffective developmental psychology; neuroaffective triangle; attachment-based family therapy; intervention plan

# APPENDIX B: PAPER 2

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# Zones of Proximal Emotional Development — Psychotherapy Within a Neuroaffective Perspective

Susan Hart & Stine Lindahl Jacobsen

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# Zones of Proximal Emotional Development — Psychotherapy Within a Neuroaffective Perspective

Susan Hart, Ph.D. Student and Stine Lindahl Jacobsen, Ph.D.

**ABSTRACT**

This article outlines a conceptual framework for assessing personal and emotional functions of a person's zone of proximal emotional development. The framework is based on the integrative theory Neuroaffective Developmental Psychology (NADP), which brings together attachment theory, neuropsychology, developmental psychology, and trauma theory. Within the NADP framework, this article describes a way of understanding children's normal emotional mental organization and of examining how this mental organization may be developed or disturbed by relational issues. It also describes how a child's mental organization can be disturbed and thus, without intervention, disturb the child's personality development on a lifelong basis. The article presents three case vignettes, describing three children growing into adolescence with three different attachment patterns and suggested individually tailored intervention plans for each of them, relevant and useful for clinicians working with vulnerable children and families. Because the nervous system retains its plasticity throughout life, attachment is not necessarily an unchangeable pattern. That is why we as clinicians should develop psychotherapeutic methods and a research-based way of determining "what works for whom" by assessing the zone of individual proximal emotional development. The text outlines the characteristics of NADP and how it can be used to structure an intervention plan.

## Introduction

"Are there critical periods of self-development? If so, what are they? Do specific aspects of the self develop as specific periods? If self-development is a maturational process, how flexible is it? If there is a fixed timetable, what are the implications for the clinical intervention? Are there important data from contemporary development neuroscience that may inform our theories of self? Might there be precocious self-development analogous to precocious ego development? … how does the child's self emerge from the mother-child matrix, and is this process ever completed?" (Gergely et al., 2000, p. 25). These were all questions formulated by Gergely, Alvarez, Mayes, Bach, Slade, and Ellman in 2000 at a panel discussion on development and the self. In this article, small humble steps are laid to consider these huge developmental questions through the theoretical framework: Neuroaffective Developmental Psychology (NADP).

NADP rests on research-based knowledge about the emotion-regulating structures in the human brain, studies of attachment in developmental psychology, developmental psychopathology, and trauma research (Hart, 2008, 2011). This theoretical synthesis began in the 1990s, and the groundbreaking publication from Alan Schore, *Affect Regulation and the Origin of Self* (Schore, 2016), became an inspiration for many in the field. His thorough work made an important foundation for linking psychoanalysis and attachment theory with the latest brain research findings.

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# APPENDIX C: RESULTS OF THE LITERATURE REVIEW

*Table of the findings of assessment methods and tests regarding 4–12-year-olds' emotional development, competencies and vulnerabilities*

| Search method | Name of test | Author, year | Age group | Main focus | Analysis method |
|---|---|---|---|---|---|
| **Snowball:** | BERS (preBERS)<br><br>(Behavioral and Emotional Rating Scale) | Epstein<br><br>(1999) | Children and adolescents | Behavioural and Emotional. | Questionnaire/ rating scale |
| **Hand search:** | BYI (Beck Youth Inventories) | Beck, Beck & Jolly (2005) | 7–18 years | Evaluate children's and adolescents' emotional and social impairment. | Questionnaire/ rating scale |
| **Hand search:**<br><br>Publisher: Hogrefe | CAT (Children's Apperception Test) and<br><br>TAT (Thematic Apperception Test) | Bellak & Bellak (1949)<br><br>Murray (1943) | 3–10 years<br><br>10–18 years | Personality structure based on psychoanalytical theory. | Projective test |
| **Database:** | CDCDAS **(**Cassle-DeMoulin Child Development Age Scale**)** | DeMoulin (1997) | 36–72 months | Emotional development skills, social development skills. | Questionnaire/ rating scale |
| **Database:** | DeMoulin Self-Concept Developmental Scale | DeMoulin (1999) | 36–72 months | Social competence and behavioural and emotional regulation. | Questionnaire/ rating scale |
| **Hand search:**<br><br>Publisher: WPS | DP-2/3 (Development Profile 2 and 3) | Alpern, Boll & Shearer (1986) | 0–12 years | Socio-emotional development (a part of the test). | Questionnaire/ rating scale |

| | | | | | |
|---|---|---|---|---|---|
| **Primo: Keyword:** Emotional Development Scale | ECS (Emotional Cognitive Scale) | Wintre & Vallance (1994) | Young children | Measures the intensity and valency of five different emotions over 15 different scenarios by asking the children how they think they would feel in different situations. | Performance |
| **Google Scholar:** Emotional Development Scale | Emotional Development Scale | Rhew & Choquette (2014) | 2–18 years | One-page summary of personality competencies developed every second year of life. | Self- and parental judgement |
| **Database:** | ESE (Emotional Self-Efficacy Scale) | Qualter, Pool, Gardner, Ashley-Kot, Wise & Wols (2014) | 11–13 years | Measurement of self-beliefs in relation to the management of emotions. | Questionnaire/ rating scale |
| **Hand search:** Publisher: WPS Publishing LLC: | FAB-C (Feelings, Attitudes, and Behaviors Scale for Children) | Beitchman et al. (1996) | 6–13 years | Feelings, attitudes, and behaviours. | Questionnaire/ rating scale |
| **Hand search:** | FACS Test (Ekman 60 Faces Test) | Ekman & Friesen (1976) | Children, youth and adults | Administration of photographic representations of six basic emotions. | Performance |
| **Google Scholar: Keyword:** Emotional Assessment Scale | FEAS (Functional Emotional Assessment scale | Greenspan, DeGangi & Wieder (2001) | Infants and toddlers | Functional emotional. | Questionnaire/ rating scale |

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| **Google Scholar Keyword:** Emotional Assessment Scale | ITSEA (Social Emotional Assessment scale) (Toddlers) | Carter & Briggs-Gowan (2006) | 12–36 months | Analysis of emerging social-emotional development and intervention guidance. | Questionnaire/ rating scale |
| **Database:** | KEDS (Kids' Empathic Develop-ment Scale) | Reid, Davis, Horlin, Anderson, Baughman, & Campbell (2013) | Children of primary-school age | Assessment of some core affective, cognitive and behavioural components of empathy through responses to picture scenarios of individual and interpersonal situations differing in social complexity. | Projective |
| **Database:** | LEAS-C (Levels of Emotional Awareness Scale for Children) | Bajgar, Ciarrochi, Lane & Deane (2005) | Children and adolescents | Assessment of an individual's ability to be aware of his or her emotions. | Performance |
| **Hand search:** | NMT (Neuro-sequential Model of Thera-peutics) | Perry (2006; 2009) | 0–99 years | Brain mapping of sensory, affective, social and cognitive functions based on neurosequential theory. | Structured reporting |
| **Hand search:** Publisher: WPS Publishing LLC: | PIC-2 (Personality Inventory for Children) | Lachar & Gruber (2001) | 5–19 years | Behavioural summary profile of three composites: externalization, internalization and social adjustment. | Questionnaire/ rating scale |
| **Hand search:** | RME-child (Reading the Mind in the Eyes Test) | Baron-Cohen, Wheelwrig ht, Hill, Raste & Plumb (2001) | 8–19 years | Determines a child's aptitude for understanding social causality. It is a series of 28 images of eyes depicting emotional states, with forced choice between four mental-state terms for each. | Performance |

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|---|---|---|---|---|---|
| **Hand search:** Publisher: Hogrefe | Rorschach | Rorschach (1927/1998); Exner (1991; 2003); Exner & Weiner (1994) | 5 years to adult | Personality structure based on psychoanalytical theory. Subjects' perceptions of inkblots are recorded and then analysed using psychological interpretation. | Projective |
| **Hand search:** Publisher: James Battle Ass. | SAED (Social & Emotional behaviour) | Epstein & Cullinan (1998) | 5–18 years | Measures inability to learn, relationship problems, inappropriate behaviour, unhappiness or depression, physical symptoms or fears, social maladjustment and adverse effects on educational performance. | Questionnaire/ rating scale |
| **Hand search:** Publisher: PAR | SEAM (Social-Emotional Assessment /Evaluation Measure) | Squires, Waddell & Clifford (2012) | 2–66 months | Assessment tool for measuring children's social-emotional development and parenting competence. | Questionnaire/ rating scale |
| **Google Scholar: Keyword:** Emotional Develop-ment Scale | SEARS (Social-Emotional Assets and Resilience Scales) | Merell (2011) | 5–18 years | Measures social-emotional skills and assets such as social-emotional knowledge and competence, peer relationships, coping skills, problem-solving abilities, empathy and other positive traits. | Questionnaire/ rating scale |
| **Snowball:** | SCBE-30 (Social Competen-ce and Behavior Evaluation Scale-30) | Butovskaya & Demiano-vitsch (2002) | 3–6 years | Describes the child's adaptation to and functioning within a preschool classroom in order to help teachers plan interventions. | Questionnaire/ rating scale |
| **Google Scholar: Keyword:** Emotional Develop-ment Scale | SECDS (Social-Emotional and Character Developme nt Scale) | Ji, Dubois & Flay (2013) | Children of elementary-school age | Measures social-emotional skills and character. | Questionnaire/ rating scale |

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| **Hand search:**<br><br>Publisher: Hogrefe | SEE (Social Emotional Evaluation) | Wiig (2008) | 6–13 years | Assessment of social competencies based on audio and visual material. | Performance |
| **Hand search:**<br><br>Publisher: Hogrefe | SRS (Social Responsive ness Scale) | Constantino (2005) | 4–18 years | Distinguishes autism-spectrum conditions from other psychiatric conditions in children. | Questionnaire/ rating scale |
| **Google Scholar: Keyword:** Emotional Developme nt Scale | SEDS (Socio-Emotional Dimension Scale) | Hutton & Roberts (1986) | 6–19 years | Provides information about avoidance of peer and teacher interactions, aggressive interactions, inappropriate behaviour, depressive reactions and physical fear reactions. | Questionnaire/ rating scale |
| **Google Scholar: Keyword:** Emotional Intelligence Scale for Children | Sullivan Emotional Intelligence Scale for Children | Sullivan (1999) | 5–7 years<br>8–10 years | Provides information about children's empathic reactions. The tester reads each item to the child, and the child is required to respond with "yes" or "no" or "I don't know". | Questionnaire/ rating scale |
| **Google Scholar: Keyword:** Emotional Developme nt Test | TEC (Test of Emotion Comprehen sion) | Pons & Harris (2000) | 3–11 years | Short story accompanied by cartoon scenarios is read aloud. Child indicates the emotional response of the story protagonist by pointing to one of four cartoon faces representing different emotions. | Performance |
| **Google Scholar: Keyword:** Emotional Developme nt Test | TED (Tasks of Emotional Developme nt) | Cohen & Weil (1975a; 1975b) | 6–18 years | Twelve photos from the 1940-50s of middleclass persons (similar to TAT). | Projective |
| **Database:** | Q-sort Scale – emotional regulation | Shields & Cicchetti (1997) | 3–11 years | Observers rate behaviour and temperament during home visits based on naturalistic observation. | Structured observation |

## References


Alpern, G. D., Boll, T. & Shearer, M. (1986). *Developmental Profile II: Manual Pamphlet.* Torrance, CA: Western Psychological Services.

Bajgar, J., Ciarrochi, J., Lane, R. & Deane, F.P. (2005). Development of the levels of Emotional Awareness Scale for Children (LEAS-C). *British Journal of Development Psychology*, 23(4), 569–586. doi: 10.1348/026151005X35417

Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y. & Plumb, I. (2001). The 'Reading the Mind in the eyes' test revised version: A study with normal adults, and adults with Asperger syndrome or high-functioning autism. *Journal of Child Psychiatry and Psychiatry*, 42, 241–252.

Beck, J. S., Beck, A. T. & Jolly, J. B. (2005*). Beck Youth Inventories.* Lutz, FL: Pearsons.

Beitchman, J. H., Wilson, B., Brownlie, E. B., Walters, H., Inglis, A., & Lancee, W. (1996). Long-term consistency in speech/language profiles: II. Behavioral, emotional, and social outcomes. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35, 815–825.

Butovskaya, M. L. & Demianovitsch, A. N. (2002). Social Competencies and Behavior Evaluation (SCBE) and Socialization Values (SVQ): Russian children ages 3 to 6 Years. *Early Education and Development*, 13(2), 153–170. doi.org/10.1207/s15566935eed1302_3.

Carter, A. S. & Briggs-Gowan, M. J. (2006). *Infant-Toddler Social and Emotional Assessment.* San Antonio, TX: Harcourt.

Cohen, H., & Weil, G. R. (1975a). *Tasks of Emotional Development Test kit.* Brookline, MA: Massachusetts School of Professional Psychology.

Cohen, H., & Weil, G.R. (1975b*). Tasks of Emotional Development: A Projective Test for Children and Adolescents.* Brookline, MA: Massachusetts School of Professional Psychology.

DeMoulin, D. F. (1999). A personalized development of self-concept for beginning readers. *Education*, 120(1), 14–26.

Ekman, P. & Friesen, W. (1976). *Pictures of Facial Affect.*, Palo Alto, CA: Consulting Psychologists Press.

Epstein, M. H. & Cullinan, D. (1998). Scale for Assessing Emotional Disturbance. *Journal of Emotional and Behavioral Disorders*, 6(3), 191–192. doi.org/10.1177/106342669800600307.

Epstein, M. H. (1999). The development and validation of a scale to assess the emotional and behavioral strengths of children and adolescents. *Remedial and Special Education*, 20(5), 258–262. DOI: 10.1177/074193259902000501.

Exner, J. E. (1991). *The Rorschach: A Comprehensive System*, Vol. 1 (4th edition): Basic Foundations. Hoboken, NJ: John Wiley & Sons, Inc.

Exner, J. E. (2003). *The Rorschach: A Comprehensive System*, Vol. 2, Interpretation (2nd edition): Basic Foundations. Hoboken, NJ: John Wiley & Sons, Inc.

Exner, J. E. & Weiner, I. B. (1994). *The Rorschach: A Comprehensive System*, Vol. 3, Assessment of Children and Adolescents. Hoboken, NJ: John Wiley & Sons, Inc.

Greenspan S.I., DeGangi, G. & Wieder, S. (2001) (Eds.). *The Functional Emotional Assessment Scale (FEAS) - For Infancy and Early Childhood: Clinical and Research Applications.* Bethesda, MD: Interdisciplinary Council on Development and Learning Disorders.

Hutton, J. E. & Roberts, T. G. (1986). *Social-Emotion Dimension Scale.* Austin, TX: Pro-Ed.

Ji, P., Dubois, D. L. & Flay, B. R. (2013). Social-Emotional and Character Development Scale: Development and initial validation with urban elementary school students. *Journal of Research in Character Education*, 9(2), 121–147.

Lachar, D., & Gruber, C. P. (2001). *Personality Inventory for Children* (2nd edition). Los Angeles, CA: Western Psychological Services.

Merell, K. W. (2011*). Social Emotional Assets and Resilience Scales (SEARS*). Lutz, FL: Psychological Assessment Resources (PAR, Inc.).

Murray, H. A. (1943). *Thematic Apperception Test*. Cambridge, MA: Harvard University Press.

Perry, B. (2006). Applying principles of neurodevelopment to clinical work with maltreated and traumatized children: The Neurosequential Model of Therapeutics. In: Webb: *Working with Traumatized Youth in Child Welfare* (pp. 27–52), New York, NY: The Guilford Press.

Perry, B. (2009). Examining child maltreatment through a neurodevelopmental lens: Clinical applications of the Neurosequential Model of Therapeutics. *Journal of Loss and Trauma*, 15, 240–255.

Pons, F., & Harris, P. L. (2000). *Test of Emotion Comprehension*. Oxford: Oxford University Press.

Qualter, P., Pool, L. D., Gardner, K. J., Ashley-Kot, S., Wise, A. & Wols, A. (2014). The Emotional Self-Efficacy Scale: Adaption and validation for young adolescents. *Journal of Psychoeducational Assessment*, 33(1), 33–45. doi.org/10.1177/0734282914550383

Reid, C., Davis, H., Horlin, C., Anderson, M., Baughman, N. & Campbell, C. (2013). The Kids' Empathic Development Scale (KEDS): A multi-dimensional measure of empathy in primary school-aged Children*. British Journal of Developmental Psychology*, 31(2), 231–256. doi.org/10.1111/bjdp.12002.

Rhew, J. & Choquette, R. (2014). *Emotional Development Scale*. Retrieved on 20 June 2018 from: https://www.amitahealth.org/upload/docs/ABBHH/ Emotional%20Development%20Scale%20 PDF.pdf.

Rorschach, H. (1927/1998). *Psychodiagnostics: A Diagnostic Test Based on Perception* (10th edition). Cambridge, MA: Hogrefe Publishing Corp.

Shields, A. & Cicchetti, D. (1997). Emotion regulation among school-age children: The development and validation of a New Criterion Q-Sort Scale. *Developmental Psychology*, 33(6), 906–916. PMID:9383613

Squires, J. K., Waddell, M. L. & Clifford, J. R. (2012). A psychometric study of the infant and toddler intervals of the Social Emotional Assessment Measure. *Topics in Early Childhood Special Education,* 33(2), 78–90. doi.org/10.1177/0271121412463445.

Sullivan, A. K. (1999). *The emotional intelligence scale for children*. Unpublished Doctoral Dissertation. Charlottesville, VA: University of Virginia.

Wiig, E. (2008). *SEE: Social Emotional Evaluation. Evaluate Social Skills & Higher-Level Language in Everyday Situations at Home, School, & in the Community*. North Tonawanda, NY: MHS Assessments.

Wintre, M. G., & Vallance, D. D. (1994). A developmental sequence in the comprehension of emotions: Intensity, multiple emotions, and valence. *Developmental Psychology, 30*(4), 509–514. doi.org/10.1037/0012-1649.30.4.509.

# APPENDIX D: PARTICIPANTS CONSENT FORM

# Samtykkeerklæring vedrørende deltagelse i PhD forskningsprojekt

I denne samtykkeerklæring giver du accept af og tilladelse til, at du og dit barn, som du har forældremyndigheden over, deltager i forskningsprojektet *Effektevaluering af familieintervention*, hvori der indgår følgende tests:

Emotional Development Scale (EDS),
Marschak Interaction Method Psychometrics (MIM-P)
Neuroaffektivt Mentaliserings Interview (NMI)
Parent Stress Index (PSI) (spørgeskema)
Parent-Child Relationship Inventory (PCRI) (spørgeskema)

Tilsagnet giver Susan Hart (forskeren) tilladelse til at opbevare og behandle de anonymiserede oplysninger, der afgives til brug for projektet. Alle de oplysninger, der afgives, er beskyttet i henhold til Persondataloven og vil blive behandlet fortroligt af Susan Hart (forskeren). Besvarelser fra tests og information om dig og dit barn bliver analyseret i anonymiseret form, således at besvarelserne ikke vil kunne identificeres. Videooptagelserne opbevares af familiecentret, og slettes efter aftale med dem, med mindre andet er aftalt.

Du kan på et hvilket som helst tidspunkt vælge at afbryde forløbet, uden det får nogen konsekvenser for dig selv eller dit barn.

I forbindelse med dit tilsagn er du blevet mundtlig informeret om anvendelsen af materialet og har fået udleveret ”Formål med PhD forskningsprojektet”.

Du er desuden informeret om dine rettigheder mht. at trække dit tilsagn tilbage.

FAR/MOR/VÆRGE

DATO _____

NAVN_____

UNDERSKRIFT_____

Det bekræftes, at der er givet information og udleveret ”Formål med PhD forskningsprojektet”, som ovenfor nævnt.

Dato.....

Underskrift.....

# Formål med PhD forskningsprojektet

Formålet med PhD forskningsprojektet er at udvikle tre tests (EDS, MIM-P og NMI), der kan pege på hvilken slags intervention, der kan støtte et barns følelsesmæssige, personlighedsmæssige og sociale udvikling. Idet følelsesmæssig udvikling finder sted i en relationel kontekst vil barnets følelsesmæssige udvikling korreleres med forældre/barn interaktionen og forældrenes mentaliseringskapacitet.

I forskningsprojektet korreleres EDS, som er en performance test for børn, MIM-P, som er en observation af et samspil, og NMI, som er et interview til forældre, med to evidensbaserede spørgeskemaer, Parent Stress Index (PSI) og Parent-Child Relationship Inventory (PCRI). De samme fem tests anvendes før og efter en seks måneders periode. EDS, MIM og NMI scores på baggrund af videooptagelser.

I forskningsprojektet indgår der 40 børn, i alderen 4-12 år sammen med en af deres forældre, som er indskrevet på familiebehandlingscenter. I forskningsprojektet indgår otte familiebehandlingscentre fra hhv. Esbjerg, Fredericia, Ikast/Brande, Nyborg, Kalundborg, Roskilde, Hillerød og Tårnby kommuner. To psykologer fra hver familiecenter er ansvarlig for testningen. Forskeren deltager ikke i godkendelsen af familierne og de er anonymiseret for forskeren. Testresultaterne sendes til forskeren, og for at sikre re-test pålidelighed gentestes barnet med EDS 1-7 uger efter første testgang. Efter en periode på seks måneder gentages testningen med samme scoringsprocedure. Når anden test periode er afsluttet sendes resultaterne ligeledes til forskeren. Den første testperiode strækker sig fra september-december 2016, og den anden testperioden strækker sig fra marts-juni 2017.

# Declaration of consent concerning participation in PhD research project

In this declaration of consent you give your approval of and permission for the AV recordings that have been made of you and your child, whom you have custody of, in connection with the research project *Effect evaluation of family intervention*, which includes the following tests:

Emotional Development Scale (EDS)
Marschak Interaction Method Psychometrics (MIM-P)
Neuroaffective Mentalizing Interview (NMI)
Parent Stress Index (PSI) (questionnaire)
Parent-Child Relationship Inventory (PCRI) (questionnaire)

The consent gives Susan Hart (the researcher) permission to store and process the anonymized information, which is provided for use in the project. All the information that is provided is protected under the Danish Data Protection Act and will be treated as confidential by Susan Hart (the researcher). Results from tests and information about you and your child will be analysed in an anonymized form, where it will not be possible to identify the results. The video recordings are stored by the family treatment centre and are erased after agreement with them, unless other arrangements are made.

You may choose to break off the process at any time; if you choose to do so, it will not have any consequences for your or for your child.

In connection with your consent you have been verbally informed about the use of the material and have received a copy of 'Purpose of PhD research project'.

You have also been informed of your right to retract your consent.

FATHER/MOTHER/GUARDIAN

DATE _____

NAME _____

SIGNATURE _____

It is confirmed that information has been provided, and a copy of 'Purpose of PhD research project' has been handed out, as mentioned above.

Date .....

Signature .....

# Purpose of PhD research project

The purpose of the PhD research project is to develop three tests (the EDS, the MIM-P and the NMI) that may indicate what kind of intervention may support a child's emotional, personality and social development. As emotional development occurs in a relational context the child's emotional development is correlated with the parent/child interaction and the parents' mentalizing capacity.

In the research project, the EDS, which is a performance test for child, the MIM-P, which is an observation of an interaction, and the NMI, which is an interview for parents, are correlated with two evidence-based questionnaires, the Parent Stress Index (PSI) and the Parent-Child Relationship Inventory (PCRI). The same five tests are used before and after a six-month period. The EDS, the MIM and the NMI are scored on the basis of video recordings.

The research project includes 40 children aged 4–12 years, each along with one of his/her parents, who have been referred to a family treatment centre. The research project includes eight family treatment centres in the municipalities of Esbjerg, Fredericia, Ikast/Brande, Nyborg, Kalundborg, Roskilde, Hillerød and Tårnby. Two psychologists from each family centre are responsible for conducting the tests. The researcher does not take part in approving the families, and they are anonymized in relation to the researcher. The test results are sent to researcher, and to ensure re-test reliability the child is retested on the EDS 1 to 7 weeks after the first test. After a period of six months the testing is repeated using the same scoring procedure. When the second test period has been completed, these results too are sent to the researcher. The first test period goes from September to December 2016, and the second test period goes from March to June 2017.

# APPENDIX E: PARTICIPANTS CONSESCENT FORM REGARDING AV-RECORDINGS

# Samtykkeerklæring vedrørende brug af AV-optagelse til undervisningsbrug

I denne samtykkeerklæring giver du din accept af og tilladelse til, at de AV-optagelser, der er blevet optaget af dig og dit barn, som du har forældremyndigheden over, i forbindelse med forskningsprojektet *Effektevaluering af familieintervention*, hvori du og/eller dit barn er videooptaget, enten må anvendes til at blive set igennem af forskeren (Susan Hart) eller anvendes til undervisningsbrug til fagpersoner. Det drejer sig om optagelser af følgende tests:

Emotional Development Scale (EDS),
Marschak Interaction Method Psychometrics (MIM-P)
Neuroaffektivt Mentaliserings Interview (NMI)
Parent Stress Index (PSI) (spørgeskema)
Parent-Child Relationship Inventory (PCRI) (spørgeskema)

I forbindelse med dit tilsagn om ovennævnte anvendelse af videooptagelserne er du blevet mundtlig informeret om anvendelsen og har fået udleveret "Retningslinjer ved optagelse, anvendelse og opbevaring af AV-materiale".

Du er desuden informeret om dine rettigheder mht. at trække dit tilsagn tilbage til enhver tid.

Jeg giver hermed mit samtykke til at optagelser i forbindelse med *Effektevaluering af familieintervention* må:

Blive set igennem af forskeren: ☐

Anvendes til undervisningsbrug til fagpersoner: ☐

Dato.....

Underskrift.....

Det bekræftes, at der er givet information i henhold til ovenstående og udleveret *Retningslinjer ved optagelse, opbevaring og anvendelse af AV-materiale*

Dato.....

Underskrift.....

# Retningslinjer ved optagelse, opbevaring og anvendelse af AV-materiale

Formålet med optagelsen er anvendelse ved undervisning til fagpersoner De udarbejdede retningslinjer skal sikre de medvirkendes anonymitet og rettigheder.

**1. Typer af audiovisuelt materiale**
Forskellige slags audiovisuelt materiale omfatter lydbånd, DVD, film og andre hjælpemidler af lignende art.

**2. De medvirkendes rettigheder**
Ved enhver optagelse, afspilning eller forevisning af en AV-optagelse skal sikres anonymisering af materialet, ligesom tavshedspligten skal fastholdes i lighed med, hvad der gælder for journalmateriale.
Ved optagelser af foredrag indeholdende case-materiale, skal patienten/klienten/forælderen sikres samme rettigheder.

Enhver medvirkende patient/ klient/ terapeut/ supervisand/ supervisor skal orienteres om, hvilke professionelle grupper den påtænkte optagelse er beregnet for og om optagelsen er en del af behandling, undervisning eller forskning. Den medvirkendes deltagelse er frivillig ligesom vedkommende skal informeres om retten til at gennemse optagelsen inden forevisningen. Hvis medvirkende ikke accepterer optagelsen og anvendelsen, vil vedkommende kunne trække tilsagnet tilbage og få optagelsen slettet. Hverken afvisning af deltagelse eller ønske om at få optagelsen slettet på et senere tidspunkt må få nogen indflydelse på evt. igangværende behandling, forskning eller supervision. Ved optagelser med børn og unge under 18 år skal deres forældre give deres skriftlige samtykke.

**3. Samtykkeerklæring**
Den medvirkende patient/klient/terapeut/psykolog/supervisor skal have accepteret deltagelse ved underskrivelse af samtykkeerklæring. Af erklæringen skal fremgå, at den medvirkende har fået den krævede information og er bekendt med sine rettigheder. Samtykkeerklæringen udfærdiges i to eksemplarer, hvor den ene udleveres til den medvirkende og anden opbevares af institutionen.

**4. Rettigheder til optagelsen og opbevaring**
AV-optagelser må ikke udlånes til andre og efter den afsluttede forskningsperiode overgår AV-materialet til forskeren (cand.psych. Susan Hart). Opbevaring af AV-materialet sker i henhold til persondataloven.

**5. Udlån**
Ved evt. udlån skal betingelserne vedr. anonymitet og tavshedspligt være opfyldt – se pkt. 2.
Anvendelse af AV-optagelser til udlån må kun ske til de samme professionelle grupper, som er nævnt ved information til de medvirkende.
Låneren skal forpligte sig til ikke at kopiere lånte optagelser.
Alt udlån er tidsbegrænset. Hvis udlånet skal forlænges, skal det ske efter fornyet anmodning og accept.

# Declaration of consent regarding the use of AV recordings for educational use

In this declaration of consent you give your approval of and permission for the AV recordings that have been made of you and your child, whom you have custody of, in connection with the research project *Effect evaluation of family intervention*, where you and/or your child have/has been video-recorded, to be used either to for review by the researcher (Susan Hart) or for educational use with professionals. Your consent concerns the following tests:

Emotional Development Scale (EDS)
Marschak Interaction Method Psychometrics (MIM-P)
Neuroaffective Mentalizing Interview (NMI)
Parent Stress Index (PSI) (questionnaire)
Parent-Child Relationship Inventory (PCRI) (questionnaire)

In connection with giving your consent for the above-mentioned use of the video recordings you have been verbally informed about the use and have received a copy of 'Guidelines for the recording, use and storage of AV material'.

You have also been informed of your right to retract your consent at any time.

I hereby give my consent that recordings made in connection with *Effect evaluation of family intervention* may:

Be reviewed by the researcher: ☐

Be used for educational purposes with professionals: ☐

Date.....

Signature.....

It is confirmed that information has been given in accordance with the above and that a copy of '*Guidelines for the recording, use and storage of AV material*' has been handed out.

Date .....

Signature .....

# Guidelines for the recording, use and storage of AV material

The purpose of the recording is educational use for professionals. The guidelines that have been drawn up aim to secure the anonymity and rights of the participants.

**1. Types of audiovisual material**
Different kinds of audio-visual material, including audio tapes, DVD, film and other similar devices.

**2. The participants' rights**
In any recording, play-back or presentation of an AV recording, the material must be anonymized, and confidentiality must be maintained on the same level that applies to other records/case files. In recordings of lectures containing case material, the patient/client/parent must be ensured the same rights.

Any participating patient/client/therapist/supervisee/supervisor must be informed about which professional categories the considered recording is intended for, and whether the recording is part of treatment, education or research. Participation is voluntary for the participant, and the person must be informed about the right to review the recording before any presentation. If the participant does not approve the recording and the use, the person may retract his or her consent and have the recording erased. Neither refusing to participate nor a request to have the recording erased at a later time may have any influence on any ongoing treatment, research or supervision. For recordings involving children and adolescents under the age of 18 years, their parents have to give their written consent.

**3. Declaration of consent**
The participating patient/client/therapist/psychologist/supervisor must have agreed to participate when the declaration of consent is signed. The declaration must state that the participant has received the required information and is aware of his or her rights. The declaration of consent is printed in two copies, one of which is handed to the participant, while the other is stored by the institution.

**4. Rights to recording and storage**
AV recordings cannot be lent to others, and after the completion of the research period, the AV material is turned over the researcher (MA (psych) Susan Hart). Storage of the AV material must comply with the Danish Data Protection Act.

**5. Lending**
In case of lending, the conditions concerning anonymity and confidentiality must be met – see pt. 2. Any lending of AV recordings can only happen to the same groups of professionals that are mentioned in the information given to the participants. The borrower must commit to not copying the borrowed recordings. All lending is time-limited. If the loan is to be extended, it requires renewed request and approval.

# APPENDIX F: APPROVAL FROM THE HEALTH RESEARCH ETHICS

Start på videresendt besked:
**Fra:** Videnskabsetisk Komité <vek@rn.dk>
**Dato:** 14. juni 2016 kl. 15.33.59 CEST
**Til:** 'Susan Hart' <susan.hart@icloud.com>

Kære Susan Hart

Du har ved mails af 11. maj samt 10. juni 2016 forespurgt Den Videnskabsetiske Komité for Region Nordjylland om anmeldelsespligt at dit planlagte projekt.

På baggrund af de fremsendte oplysninger er det sekretariatets opfattelse, at projektet *ikke* er omfattet af komitélovens (lov nr. 593 af 14/6/2011) definition på et sundhedsvidenskabeligt forskningsprojekt og derfor ikke skal anmeldes til og godkendes af komitéen, jf. komitélovens § 14, stk.1, jf. § 2, nr 1, idet der er tale om validering af tre psykologiske tests.

Projektet kan iværksættes uden yderligere tilbagemelding fra Den Videnskabsetiske Komité for Region Nordjylland.

Klagevejledning: afgørelsen kan, jf. komitélovens § 26, stk. 1, indbringes for Den Nationale Videnskabsetiske Komité senest 30 dage efter, afgørelsen er modtaget. Den Nationale Videnskabsetiske Komité kan, af hensyn til sikring af forsøgspersoners rettigheder, behandle elementer af projektet, som ikke er omfattet af selve klagen. Klagen samt alle sagens dokumenter sendes til: Den Nationale Videnskabsetiske Komité – DKetik@DKetik.dk
Med venlig hilsen

**SEKRETARIATET for DEN VIDENSKABSETISKE KOMITÉ for REGION NORDJYLLAND**
Niels Bohrs Vej 30
9220 Aalborg Ø
Tlf. 97 64 84 40
vek@rn.dk
www.vek.rn.dk

## Translation

Beginning of forwarded message:
**From:** North Denmark Region Committee on Health Research Ethics <vek@rn.dk>
**Subject: Re: Should I notify you of my PhD research project?**
**Date:** 14 June 2016 at 15.33.59 CEST
**To:** 'Susan Hart' <susan.hart@icloud.com>

Dear Susan Hart,

In emails of 11 May and 10 June 2016 you contacted the North Denmark Region Committee on Health Research Ethics concerning the potential obligation to notify the committee of your planned project.

Based on the received information it is the determination of the secretariat that the project is *not* included in the definition of a health research project under the Komitéloven [Committee Act] (Act no. 593 of 14 June 2011) and hence notification of and approval from the committee are not required, cf. Sec. 14, par.1, cf. Sec. 2, no. 1 of the Committee Act, as it pertains to the validation of three psychological tests.

The project may be initiated without further reply from the North Denmark Region Committee on Health Research Ethics.

Complaints: according to the Committee Act, Sec. 26, par. 1, complaints may be filed with the Committee on Health Research Ethics within 30 days of receipt of the decision. For the sake of securing the rights of test subjects, the Committee on Health Research Ethics may address elements of the project that are directly not included in the complaint. The complaint and all the documents pertaining to the case may be sent to the Committee on Health Research Ethics – DKetik@DKetik.dk

Yours sincerely,

**THE SECRETARIAT of the NORTH DENMARK REGION COMMITTEE ON HEALTH RESEARCH ETHICS**
Niels Bohrs Vej 30
9220 Aalborg Ø
Tel. [+45] 97 64 84 40
vek@rn.dk
www.vek.rn.dk

# APPENDIX G: APPROVAL FROM THE DANISH PROTECTION AGENCY

DATATILSYNET

Cand.Psych Susan Hart
Brandsbjerg 46
4400 Kalundborg

Sendt til: susan.hart@me.com

6. juni 2016

Datatilsynet
Borgergade 28, 5.
1300 København K

CVR-nr. 11-88-37-29

Telefon 3319 3200
Fax 3319 3218

E-mail dt@datatilsynet.dk
www.datatilsynet.dk

J.nr. 2016-41-4764
Sagsbehandler
Suzanne Stenkvist
Direkte 3319 3256

**Vedrørende anmeldelse af: Emotional Development Scale (EDS) and Neuroaffective Mentalizing Interview (NMI) as Basis for Effect Evaluation in Family Intervention**

Du har den 6. juni 2016 anmeldt ovennævnte projekt til Datatilsynet efter persondatalovens[1] § 48, stk. 1. Du har samtidigt søgt om Datatilsynets tilladelse.

Det fremgår af anmeldelsen, at projektet kræver tilladelse fra det videnskabsetiske komitésystem.

## Fritagelse fra anmeldelse

Fra den 15. maj 2012 skal private sundhedsvidenskabelige forskningsprojekter, som skal anmeldes til det videnskabsetiske komitésystem, ikke længere anmeldes til Datatilsynet.

Undtagelserne fra pligten til anmeldelse fremgår af Datatilsynets undtagelsesbekendtgørelse. Bekendtgørelsen kan også læses på Datatilsynets hjemmeside www.datatilsynet.dk under punktet "Lovgivning".

*Datatilsynet skal herefter orientere dig om, at dit projekt er fritaget fra anmeldelse, jf. ovennævnte bekendtgørelse.*

## Persondataloven skal stadig overholdes

Selv om dit sundhedsvidenskabelige forskningsprojekt ikke længere skal anmeldes til Datatilsynet, skal persondataloven – og eventuel anden relevant lovgivning – stadig overholdes. Det betyder bl.a., at persondatalovens regler om datasikkerhed og rettigheder for de personer, der registreres oplysninger om, skal overholdes.

For at opfylde lovens regler, skal du derfor overholde de **krav**, som Datatilsynet har fastsat for sundhedsvidenskabelige forskningsprojekter, der ikke skal anmeldes til tilsynet. Kravene er tilgængelige på Datatilsynets hjemmeside under "Erhverv" – "Forskere og medicinalfirmaer" – "Sundhedsvidenskabelige forskningsprojekter". Kravene kan også hentes her.

[1] Lov nr. 429 af 31. maj 2000 om behandling af personoplysninger med senere ændringer

**Det retlige grundlag for behandling af personoplysninger**

Behandling af oplysninger i sundhedsvidenskabelige projekter, der kræver tilladelse fra det videnskabsetiske komitésystem, kan ske på baggrund af persondatalovens **§ 10** uden samtykke fra den registrerede[2].

**Sagen afsluttes**

Datatilsynet betragter hermed din anmeldelse som bortfaldet.

Hvis projektet mod formodning ikke er omfattet af undtagelsesbekendtgørelsen, bedes du kontakte Datatilsynet eller undertegnede.

Med venlig hilsen

Suzanne Stenkvist

[2] Der kan dog være krav om samtykke mv. efter anden lovgivning i forbindelse med sådanne projekter

DATATILSYNET

MA (Psych) Susan Hart
Brandsbjerg 46
4400 Kalundborg

Sent to: susan.hart@me.com

6 June 2016

Datatilsynet
(Danish Data Protection Agency)
Borgergade 28, 5.
1300 Copenhagen K

VAT: DK 11-88-37-29

Tel. [+45 3319 3200
Fax [+45] 3319 3218

Email dt@datatilsynet.dk
www.datatilsynet.dk

File no. 2016-41-4764
Handled by Suzanne Stenkvist
Direct tel. [+45] 3319 3256

**Re notification for: Emotional Development Scale (EDS) and Neuroaffective Mentalizing Interview (NMI) as Basis for Effect Evaluation in Family Intervention**

On 6 June 2016 you notified the Danish Data Protection Agency of the above-mentioned project in accordance with Sec. 48, par. 1 of Persondataloven[1] [Danish Data Protection Act]. On the same occasion, you have applied the Danish Data Protection Agency for permission.

It is stated in your request that the project requires approval from the system of health research ethics committees.

**Exempt from notification**

From 15 May 2012, the Danish Data Protection Agency no longer needs to be notified of private health research projects that require approval from the system of health research ethics committees.

The exemptions from the obligation of notification can be found in the exemption order [undtagelsesbekendtgørelse]from the Danish Data Protection Agency. The order is also found on the website of the Danish Data Protection Agency, www.datatilsynet.dk, under 'Lovgivning' [Legislation].

*The Danish Data Protection Agency hereby informs you that your project are exempt from notification, cf. the above-mentioned order.*

**You still need to comply with the Danish Data Protection Act**

Although you no longer need to notify the Danish Data Protection Agency of your health research project, it must still comply with the Danish Data Protection Act – and any other relevant legislation. In part, this means compliance with the regulations in the Danish Data Protection Act concerning the data protection and the rights of the persons whose personal data is registered.

To comply with the regulations in the Act you therefore need to comply with the **requirements** that the Danish Data Protection Agency has specified for health research projects that the Agency does no need to be notified of. These

[1] Act no. 429 of 31 May 2000 on the processing of personal information incl. later changes

requirements can be accessed on the website of the Danish Data Protection Agency under 'Erhverv' – 'Forskere og medicinalfirmaer' – 'Sundhedsvidenskabelige forskningsprojekter' [Business – Researchers an pharmaceutical companies – Health research projects]. The requirements are also available here.

**The legal basis for the processing of personal information**

Processing of information in health research projects that require approval from the system of health research ethics committees may happen on the basis of **Sec. 10** in the Danish Data Protection Act without the consent of the registered person[2].

**Case closed**

With this, the Danish Data Protection Agency considers your notification rescinded.

If the project, contrary to assumption, is not included under the exemption order, please contact the Danish Data Protection Agency or myself.

Yours sincerely,

Suzanne Stenkvist

[2] Such projects may, however, be subject to the mandatory requirement of consent etc. based on other legislation.

# APPENDIX H: RIGHTS AND PERMISSION REGARDING THE PCRI

Upon receipt of the fees (see condition #2), WPS Rights & Permissions send to you the authorization to begin conducting the Danish translation of the PCRI. Once we receive a copy of the final translation file (see condition #4), you will then receive the copyright notice (see condition #5) that must appear on each reprint of the translation along with the certificate of limited-use license. Please note, too, that WPS acknowledges you may need to adapt the PCRI scoring guidelines for the purpose of evaluating responses to your research instrument—and you have our authorization to do so with the understanding that you will register the adapted keys with WPS and securely archive it following completion of your research.

NOTE: To source the administration instructions, item content, and scoring guidelines needed for your customized application, please refer to the PCRI Manual. In case you do not have (or have direct access to) the PCRI Manual (W-293B), this message serves for the next 60 days as your authorization to purchase one at 20% Research Discount (and note that discounted orders cannot be completed over our website); if you have questions about ordering the Manual, contact WPS Customer Service at 800/648-8857 or 424/201-8800, weekdays 7:30am to 4:00pm Pacific.

WPS appreciates your interest in the PCRI, as well as your consideration for its copyright. I look forward to your reply.

Sincerely yours,

Sandra I. Ceja
WPS Rights & Permissions Specialist

sceja@wpspublish.com
424.201.8857

SC:ad

**I agree to the terms stated herein.**

30th June
**Date**

**Susan Hart**
Aalborg University

AALBORG UNIVERSITET

**Department of Communication and Psychology**

Musikterapi
Musikkens Plads 1
9000 Aalborg
Tlf. 9940 9103
slj@hum.aau.dk

To WPS

I hereby support PhD student and certified psychologist Susan Hart to use Parent-Child Relationship Inventory in her PhD study at Aalborg University. I will supervise Hart in the use of PCRI according to recognized professional ethical principles.

Best wishes

Stine Lindahl Jacobsen

Stine Lindahl Jacobsen
Ph.d., Associate professor| Head of Music Therapy Programme
Institute for Communication & Psychology | Aalborg Universitet|Kroghstræde 6 | 9220 Aalborg Øst,
Contact: slj@hum.aau.dk | ☎ (+45) 99409103

# APPENDIX I: THE PSI AND THE PCRI

## I.1 The PSI

*Table 1: Subscales of Parent and Child Domains of the PSI*

| **Child Domain** | Children make it difficult for the parents to fulfill their parenting roles or how stressful parents perceive their child | **Parent Domain** | The sources of stress of the parent-child system related to the parental functioning |
|---|---|---|---|
| DI (Distractability /Hyperactivity) | Children displays behavior associated with ADHD | CO (Competence) | Parents who possess a limited range of child management skills or don't find the parenting role reinforcing. |
| AD (Adaptability) | Child unable to adjust to changes | IS (Isolation) | Parents are often socially isolated from emotional support systems |
| RE (Reinforces parent) | Interaction between parent/child fail to produce good feelings in the parent | AT (Attachment) | Parents lack of sense of emotional closeness towards the child or perceived inability to understand the child |
| DE (Demandingness) | The parent experiences the child as demanding | HE (Health) | Deterioration in parental health caused by parenting stress |
| MO (Mood) | Children are unhappy and depressed. | DP (Depression) | Presence of significant depression in the parent or dissatisfaction with self and life circumstances |
| AC (Acceptability) | The child does not match the parent's expectations | SP | Lack of emotional and active support from the other parent regarding child management |

*Table 2: Subscales of Parenting Stress Index of the PSI*

| **Scale** | **Range of raw score** | **Scale** | **Range of raw score** | **Scale** | **Range of raw score** |
|---|---|---|---|---|---|
| Child Domain | 50-145 | Parent Domain | 69-188 | Total stress | 131-320 |
| **Subscale** | | **Subscale** | | Life Stress | 1-27 |
| Distractibility /Hyperactivity | 9-36 | Competence | 15-45 | | |
| Adaptability | 11-38 | Isolation | 6-22 | | |
| Reinforces Parent | 5-18 | Attachment | 7-22 | | |
| Demandingne | 9-31 | Health | 5-21 | | |

| | | | | | |
|---|---|---|---|---|---|
| ss | | | | | |
| Mood | 5-18 | Role Restriction | 8-32 | | |
| Acceptability | 7-21 | Depression | 9-36 | | |
| | | Spouse | 7-28 | | |

# I.2 The PCRI

*Table 3: Content of scale and number of items of the PCRI*

| Content Scales | Scale content | Number of items |
|---|---|---|
| Parental Support (SUP) | Level of practical and emotional support a parent receives | 9 |
| Satisfaction with Parenting (SAT) | The amount of pleasure and fulfillment that derives from being a parent | 10 |
| Involvement (INV) | Level of parent's interaction with and knowledge of child | 14 |
| Communication (COM) | Parent's perception of how effectively the communication is with the child | 9 |
| Limit Setting (LIM) | Parent's experience of disciplining the child | 12 |
| Autonomy (AUT) | Ability of a parent to promote a child's independence | 10 |
| Role Orientation (ROL) | Parent's attitude about gender roles in parenting. | 9 |

*Table 4: Subscale of the PCRI*

| Scale | Range of raw Score |
|---|---|
| SUP | 9-36 |
| SAT | 10-40 |
| INV | 14-56 |
| COM | 9-36 |
| LIM | 12-48 |
| AUT | 10-40 |
| ROL | 9-36 |

# APPENDIX J: INTERRATER RELIABILITY AND INTERNAL CONSISTENCY REGARDING THE NMI AND MIM-P

## J.1 THE NMI

### J.1.1 Interrater reliability

There was a significant, positive correlation between raters in the NMI in each of the three levels and of the total score, which indicates a strong agreement between the two psychologists. This suggests a strong interrater reliability of the NMI.

*Table 1: Results for interrater reliability*

| NMI Psych. 1 and 2 | ICC (N=35) |
|---|---|
| **Section A** | .786*** |
| **Section B** | .750*** |
| **Section C** | .747*** |
| **Total** | .829*** |

*< 0.05, ** <0.01, *** < 0.001

### J.1.2 Internal consistency

Section A-C and the total score appear to have good internal consistency in the NMI as Cronbach's Alpha = .857 with correlation matrix presented in table below. The correlations between section A, B and C ranged from .630-.729 ($p < 0.001$). This indicates that the scores have similar features, but they might measure different qualities of the same construct, which is desirable in this context as will be discussed in chapter 6. As the scores correlate fairly well, is seems acceptable to add all scores and calculate a total score, which also appears to have a good internal consistency with section A, B and C (.840-.912, $p < 0.001$).

*Table 2: Correlation matrix of the NMI*

| | Section B | Section C | Total |
|---|---|---|---|
| **Section A** | .630*** | .664*** | .840*** |
| **Section B** | | .729*** | .912*** |
| **Section C** | | | .897*** |

*< 0.05, ** <0.01, *** < 0.001

## J.2 THE MIM-P

### J.2.1 Interrater reliability

There was a significant, positive correlation between raters for each of the ten comparison points, which indicates a strong agreement between the two psychologists. This suggests strong interrater reliability of the MIM-P.

*Table 3: Results for interrater reliability*

| **EDS-P Psych. 1 and 2** | **ICC (N=35)** |
|---|---|
| **Structure Parent** | .911*** |
| **Structure Child** | .839*** |
| **Relational Parent** | .852*** |
| **Relational Child** | .758*** |
| **Engagement Parent** | .739*** |
| **Engagement Child** | .726*** |
| **Nurture Parent** | .806*** |
| **Nurture Child** | .736*** |
| **Challenge Parent** | .811*** |
| **Challenge Child** | .751*** |

*< 0.05, ** <0.01, *** < 0.001

### J.2.2 Internal consistency

The five different dimensions (parent and child) of the MIM-P (Structure, Relational structure, Engagement, Nurture and Challenge) appear to have good internal consistency as Cronbach's Alpha = .943 with correlation matrix presented below. The correlations between scores ranged from .531-.942 ($p < 0.01$). This indicates that the scores have similar features, but they measure different qualities of the same construct.

*Table 4: Correlation matrix of the Marschak Interaction Method-Psychometrics*

| | **Stru Pa** | **Stru Ch** | **Rel Pa** | **Rel Ch** | **Eng Pa** | **Eng Ch** | **Nur Pa** | **Nur Ch** | **Cha Pa** |
|---|---|---|---|---|---|---|---|---|---|
| **Stru Ch** | .768*** | | | | | | | | |
| **Rel Pa** | .878*** | .766*** | | | | | | | |
| **Rel Ch** | .718*** | .942*** | 804*** | | | | | | |
| **Eng Pa** | .853*** | .700*** | 901*** | 722*** | | | | | |
| **Eng Ch** | .607*** | .775*** | 720*** | 859*** | 710*** | | | | |
| **Nur Pa** | .827*** | .680*** | 889*** | 703*** | 862*** | 655*** | | | |
| **Nur Ch** | .582*** | .785*** | 738*** | 857*** | 663*** | 863*** | 739*** | | |
| **Chal Pa** | .816*** | .551** | 730*** | 566*** | 648*** | 531** | 695*** | 478** | |
| **Chal Ch** | .659*** | .760*** | 608*** | 765*** | 557** | 692*** | 532** | 628*** | 675*** |

*< 0.05, ** <0.01, *** < 0.001

The results revealed a significant positive correlation for the interrater reliability of both the NMI and MIM-P on all measured dimensions, which suggests strong agreement between the two psychologists. The internal consistency between all scales and dimensions also appeared to be strong. This makes it relevant to carry out external validity analyses of comparing EDS with NMI, MIM-P and the two standardized questionnaires.

# APPENDIX K: PAPER 3

**Emotional Development Scale: Assessing the Emotional Capacity of 4–12-Year-Olds**

**Susan Hart;**
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**Stine Lindahl Jacobsen;**
Associate Professor, Department of Communication & Psychology, Faculty of Humanities, Aalborg University, Rendsburggade 14, 9000 Aalborg, Denmark

This manuscript was prepared as part of a PhD project at the Aalborg University funded by a grant from the Faculty of Humanities, Aalborg University.
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**Abstract**

The practice of assessing children's emotional development based on a theoretical foundation of attachment theory, developmental psychology and brain research is fast developing within the field of clinical psychology and family social work. The Emotional Development Scale (EDS) has been developed to assess current emotional functioning level including a focus on autonomic, limbic, and prefrontal levels of mental organization for 4-12-year-olds within the theoretical framework of neuroaffective developmental psychology (NADP). Included in the pilot study were eight family treatment centres around Denmark with 36 families participating. The psychometric investigation included analyses of interrater reliability, test-retest reliability and internal consistency while construct validity was analysed by correlating EDS results between referred and non-referred groups. We concluded that the EDS seems to be a reliable and partly valid tool, which could be a helpful addition to the existing methods of assessing emotional development of 4–12-year-olds. Further research on psychometric properties and clinical application of EDS is needed.

**Keywords** emotional development scale, emotional assessment, neuroaffective developmental psychology, emotional regulation, emotional age

# SUMMARY

The practice of assessing children's emotional development is fast developing within the field of clinical psychology and family social work. The researcher in cooperation with colleagues has developed a measurement tool, the Emotional Development Scale (EDS), to assess the current emotional functioning level of 4–12-year-olds.

The research design is based on a fixed correlational design with quantitative data and statistical analyses. The main focus of the study is to investigate the reliability and validity of the EDS. A preliminary ad hoc sample (n=213) from Hogrefe Ltd. is correlated with the empirical data regarding concurrent and predictive validity. Subjects in the study were 36 children, aged 4–12 years, each along with a parent, who had been referred to a day-family-treatment centre. Included in the study were eight day-family-treatment centres located in various parts of Denmark.

The results indicate a strong agreement between raters, and a significant correlation was found in the test-retest analysis with a good internal consistency. In a comparison of age groups and referred/non-referred groups, significant differences were revealed.

The study suggests that the EDS offers a consistent measure of the emotional competencies and vulnerabilities of 4–12-year-olds and is suited for determining their emotional developmental age, competencies and difficulties.

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