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What distinguishes autism spectrum disorders from other developmental disorders before the age of four years?

■ **Abstract** The increasing recognition of the benefits of early intervention for children with autism spectrum disorder (ASD) stresses the importance of early identification of children who might benefit from those programs. However, in the early years of life it may be dif-

ficult to distinguish children with ASD from children with other developmental disorders. The aim of the present study was to identify behavioural patterns that could facilitate this differentiation. Prior to diagnostic assessment, 2- and 3-year-old children ($n = 30$), all referred to a clinic for “possible autism”, were observed in a semi-structured play interaction, and their parents were interviewed about the children’s early development from 0 to 24 months. Following diagnostic assessment, the 17 children fulfilling the ICD-10 criteria for ASD were compared to the 13 children diagnosed with other developmental disorders

(outside the autism spectrum). On the basis of parent reports only a few distinguishing signs of ASD were found before 24 months of age. On the basis of professional observations in a semi-structured play interaction several distinguishing signs were found for the 2- and 3-year-olds; smiles in response, responds to name, follows pointing, looks to “read” faces, initiates requesting verbal and non-verbal behaviours, and functional play.

■ **Key words** autism spectrum disorder – other developmental disorders – early identification – distinguishing features

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Introduction

Autism spectrum disorder (ASD) is a developmental disorder characterized by impairment in social interaction, delays and deviancies in communication, and restricted and repetitive patterns of interests and behaviours [4, 27]. These symptoms appear to fall along a continuum from severe to milder forms of the disorder with “narrow” autism as the prototypic disorder [26]. Current evidence indicates that early intervention, if individualized, can enable the child with ASD to develop better social relationships, learn better communication skills, and decrease the intensity of stereotypic and bizarre behaviours [15, 21, 22, 24]. This makes early identification of children who might benefit from those programs essential. However, early diagnosis is a challenge for clinicians. The particular pattern of symptoms

present in a 2- or 3-year-old with ASD differs from that seen at the more prototypical age of 4 or 5 years [10, 17, 22] and the diagnostic criteria (DSM-IV and ICD-10) do not fit with very young children.

ASD is present from very early in life but is still rarely diagnosed before the age of 3 [14]. This explains why knowledge of the autistic child’s early development has been limited. Several studies over the past 10 years have identified significant early behavioural signs of autism. In the majority of these studies, children with ASD are compared to children with normal development. However, distinguishing autistic development from normal development is rarely the task for the clinician. For her it is more vital to be able to distinguish ASD from other developmental disorders that also affect communication and social interaction. The present study was designed to meet this diagnostic challenge. The aim of the study was to identify behavioural patterns during the

first years of life that are specific to autism and can distinguish children with ASD from children with other kinds of developmental disorders.

Prior to the description of the present study particular attention will be paid to the methodological problems associated with distinguishing ASD from other developmental disorders before 4 years of age. This short and by no means exhaustive review will focus on strengths and weaknesses of different methodologies.

■ Information from parents of children with autism

The most obvious route to information about a child's early development is through interviews with the parents. This method was used by Dahlgren and Gillberg [13] in a study, where parents were asked to recall their child's early development going back 10–15 years. Retrospective studies based on parental recall are associated with a relatively high degree of unreliability. Many details are lost and parent memories may be selective and influenced by the later process of diagnosis as well as increased knowledge about the disorder. These biases can be minimized by interviewing parents immediately after diagnoses, while the child is still young. This method was used in a study by Gillberg et al. [14] involving children diagnosed with autism before the age of three. The following identifying features were found for 10 of the 12 children in the study: 1) the child does not play with other children; 2) the child does not attempt to attract adult attention; 3) the child appears deaf; and 4) the child does not imitate or point. Because approximately 75% of children with autism also have mental retardation, it can be difficult to determine the extent to which deviations reported by parents are specific to autism or whether they are related to the associated mental retardation. This can be ascertained if compared to reports from parents to children with other developmental disorders.

■ Home videos

Another source of information regarding development in the very early years of life is through video recordings before the child's difficulties were acknowledged. There are interesting findings from studies by Adrien et al. [1–3], Bernabei et al. [9], Baranek [6] and Osterling and Dawson [20] who asked impartial experts to score children's behaviour on the basis of video observations. Compared to parental information, analyses of video films hold the advantage of obtaining more objective data. Nevertheless, there are other methodological weaknesses: The videos are of a varying quality and difficult situations are rarely recorded. It can also be difficult to assess eye contact on the basis of videos. Oster-

ling and Dawson found four behavioural characteristics which in 91% of the cases could distinguish children with autism from normal children at the age of 12 months. Children with autism did not point, did not show objects or things to others, did not frequently look at faces, and did not respond to their own name if called. One common problem with these studies is the difficulty in obtaining an appropriate comparison group.

■ Screenings of populations

A third method of investigation is the screening of a population with the aim of identifying infants or young children, who show signs of autism or who are considered at increased risk of developing autism and follow these children's development over time.

With regard to a relatively rare disorder such as autism these longitudinal designs may be analogous to "finding a needle in a haystack" to quote Baron-Cohen, Allen and Gillberg [7]. However, these researchers developed a particularly elegant variation of the screening method, and investigated siblings of children with autism. Genetically, it can be expected that 2–3% of siblings of children with autism will develop autism. In their sample, four out of 41 siblings with autism were diagnosed at the age of 30 months. Compared to other siblings, it was characteristic for the four siblings with autism that they did not engage in pretend play, did not use pointing for declaring or requiring, and did not share joint attention at the age of 18 months. Even if it is analogous to "finding a needle in a haystack" it is important to develop good instruments to screen infants for possible autism. Series of studies followed those mentioned before, in which the developed screening-instrument, the Checklist for Autism in Toddlers (CHAT), was applied in a community setting [5, 8]. About 16,000 children were screened at their 18 month developmental check-up. The intention was to test the CHAT screen's sensitivity, specificity and positive predictive value. A moderate sensitivity and low positive predictive value (PPV) was reported for a single administration, but there was an improvement of the PPV after a second administration [5], which might have been due to the older age of the children at that time [25]. By slightly altering the criteria Scambler et al. [23] increased the sensitivity to 85% with specificity maintained at 100%. CHAT represents a move toward earlier screening and identification of autism in a normal population. However, the more difficult task of differentiating autism from other kinds of developmental delays still has to be proven. Scambler et al. [23] demonstrated with the slightly altered criteria that the CHAT managed to discriminate 2-year-old children with autism from those with other developmental disorders. In the before-mentioned study of 16,000 children, 12 children failed the key items in-

volving production and comprehension of declarative pointing, gaze monitoring, and production of pretend play. These children were seen at the age of 20 months in the child development clinic and assessed for a wide range of developmental skills. The children with autism were compared to children with speech and language delays. The children with autism failed to use joint attention, they showed poor empathic response, fewer imitative behaviours, and none produced spontaneous pretend play [10, 11].

■ Observation of children in a clinical setting

Only a few investigations focus upon the dilemma of the clinician, i. e. the task of differentiating ASD from other developmental disorders in children. In a study by Lord [16], the development of a group of 2-year-olds, referred for “possible autism”, was monitored. The children were monitored from the initial clinical assessment, where diagnostic considerations were made, until eventual and reliable diagnosis at the age of three. This particular research design had several advantages. Firstly, it provided reliable observations of the children between the ages of 2 and 3, and secondly it provided a highly relevant control group, i. e. children who at the age of 2–3 exhibited behavioural patterns similar to children with autism, but who in the course of their development turned out to have global developmental delay or other developmental disorders.

Lord’s study showed that in 2-year-olds, the absence of the development of two behavioural patterns relating to contact and communication could reliably classify 83 % of children with autism. The two patterns were: 1) the child does not catch and direct another person’s attention; and 2) the child does not pay attention or listen to voices. The following four behavioural patterns reliably diagnosed autism in 93 % of cases: 1) the child uses the body of others as a tool; 2) the child does not pay attention to or listen to voices; 3) the child does not point, and 4) hand and finger mannerisms. The observation that the child does not attempt to share pleasure and enjoyment was regarded as a particular positive single sign of autism [16].

The present study

The aim of the present study was to explore which specific social, communicative and imaginative behaviours, already known to be associated with autism, could be helpful for the clinician in distinguishing children with autism spectrum disorders from children with other kinds of developmental disorders – before the age of four years.

The study took place in a clinical setting. The mea-

asures were a semi-structured interactive play observation as in the study of Lord [16] and a parent interview as in the study of Gillberg et al. [14]. As was the case in Lord’s study, the measures were administered before the child and family underwent the prescribed diagnostic procedures at the clinic they were referred to. Only after the diagnostic evaluation the children were allocated to one of the two comparison groups, either the ASD-group or the DD-group (DD for other developmental disorders).

Participants

Included in the study were 30 children under the age of 4 years. The 30 children were the total number of children under the age of 4 referred to a diagnostic clinic for preschool children with autism spectrum disorders and other developmental disorders at the Psychiatric Hospital for Children and Adolescents in Aarhus, Denmark. These 30 children were referred by their general practitioner or educational psychologist for “possible autism”. It took three years to collect this group of 30 successively referred very young children (1998–2001). The population of the catchment area is 650,000. The group of 30 children consisted of 5 girls and 25 boys between the ages of 23 and 47 months.

Procedures and measures

Four methods were used in the following order: 1) interview with parents about the child’s early development, 0–24 months; 2) assessment of the child’s social behaviour and communication in a semi-structured interactive play session; 3) psychological testing, and 4) a thorough clinical diagnostic evaluation following ICD-10 criteria. The interview with the parents and the semi-structured play session with the child were accomplished at the first meeting with the family at the hospital, before the diagnostic evaluation took place. Accordingly, there was no knowledge of the child’s diagnosis at that time. The following diagnostic evaluation was not based on these data.

After the diagnostic evaluation – on the basis of the clinical diagnosis – the 30 children were divided into two groups; an ASD-group comprising the 17 children who received a clinical diagnosis within the autism spectrum (14 with “narrow” autism; 2 with atypical autism; 1 with pervasive developmental disorder, unspecified) and a DD-group comprising the 13 children with other kinds of developmental disorders (mental retardation, specific developmental disorders of speech and language or hyperkinetic disorder). There was no significant age difference between the two groups.

■ Parent interview

A parent questionnaire containing 31 questions about infant behaviour was developed before the study. The first ten questions targeted the very early development from birth to 6 months of age. The remainder targeted development up to 24 months. The questions were formulated on the basis of knowledge about characteristic behaviours in 0–24 month old children with autism, documented in the research literature. The questions were tested in a small pilot study. The resulting 31 questions can be seen in Table 2. The questionnaire was administered by an experienced clinical psychologist or psychiatrist. In relation to each question the parents were requested to give examples or tell episodes from their child's first two years of life. On the basis of the parent information the interviewer filled in the questionnaire by ticking off either "yes", "no", "partly", or "do not know". These answers were converted into scores; 0 for "normal behaviour", 2 for "deviant behaviour", and 1 for "partly or maybe deviant behaviour".

■ Assessment of the child's social interaction and communication

This assessment was based on observations of the child in a semi-structured interactive play session. The intention was to create a context for observation, in which those forms of social and communicative behaviours that research has associated with the diagnosis of autism in the first years of life could be facilitated. The method was inspired by the Pre-Linguistic Autism Diagnostic Observation Scale (PL-ADOS), an early version of ADOS by Lord et al. [18] and the only available version when we planned the study in 1997. According to these methods the semi-structured play interaction incorporates the use of planned social occasions, chosen to put a "pressure" on the child for certain behaviours. The challenge is to present tasks that are sufficiently intriguing that the child wants to participate in the social interchanges.

In this study the following 15 social and communicative tasks were chosen:

Social interest and interaction: 1) smiles in response to a smiling face, 2) shows affect attunement, 3) participates in turn-taking routines, 4) responds to his/her name; *Non-verbal communication, joint attention and imitation:* 5) follows pointing, 6) shows social imitation, 7) looks to read faces for information when cheated, 8) social referencing in ambiguous situations, 9) initiates requesting non-verbal behaviour, 10) initiates declarative non-verbal behaviour (joint attention); *Body contact:* 11) seeks body contact with parents; *Use of miniature toy and imaginative play,* 12) joins functional play with miniature toys (with an adult), 13) joins imagina-

tive play (with an adult); *Communicative language:* 14) initiates requesting verbal behaviour (words or sentences), 15) initiates declarative verbal behaviour (words or sentences).

A protocol was developed, in which the fifteen tasks were described in more detail. For each task the protocol described the purpose of the task, the focus of the observation, the recommended procedure and use of play materials to engage the child in an interaction, and guidelines for scoring the child's behaviour with operationalized criteria for 0 (absent behaviour); 1 (uncertain/unstable); 2 (present behaviour). The protocol was tested and revised during a small pilot study. The protocol and the fixed assortment of toys provided a kind of standard context that facilitates the observations of the predetermined forms of social interaction, imaginative play and communication. All sessions in this study followed the protocol. A trained child mental health professional (nurse or pedagogue) interacted with the child during the semi-structured play session, while the parents were present. A trained clinical psychologist made detailed notes of the observation during the session and rated the child's behaviour immediately afterwards. The play session was the parent's first visit at the hospital and hence a very sensitive situation. For the purpose of minimizing stress, video recordings were not carried out. As a consequence, it was not possible to carry out reliability-checks by a second rater.

■ Psychological testing of early development

Mullen Scales of Early Learning [19] was used to assess developmental age in all the children. This test has five subscales; gross motor, fine motor, visual retention, receptive language, and expressive language. Because of the children's very low levels of mental functioning several children scored below the bottom, which means below a T-score of 80 or a standard score of 49. Therefore, it was not possible to calculate a T-score or standard score. As a consequence age equivalents in months for each subscale were calculated and used in this study.

■ Diagnostic evaluation

All children followed the hospital's usual thorough clinical diagnostic procedure, according to which a multidisciplinary team carried out parent interview/anamnesis, home visit, medical investigation, observation in day nursery, and further psychological assessment. The diagnosis was formulated at a team conference on the basis of all available information from the team under the responsibility of a consulting child and adolescent psychiatrist.

Results

■ Mullen Scale of Early Learning

The DD-group received higher scores on all subscales, except the subscale of gross motor function. The only significant difference found related to receptive language, in which the DD-group showed better performance (Table 1).

■ Parent information on early development from 0–24 months

On the basis of parental information regarding early development, the ASD-group and the DD-group showed significant differences in relation to only 3 out of 31 questions. Significantly more parents of children in the DD-group indicated difficulties in finding ways of comforting and settling their baby in the first 6 months of life (answer to question 5: “When the baby cried, did it settle when you picked it up?”, and to question 6: “Was it hard to find a way of comforting and settling the baby?”).

Answers to question number 30: “Did the child exhibit specific finger or hand movements (or other movement stereotypes)?” similarly differentiated between the two groups, but in this case parents of children in the ASD-group significantly more often reported deviation. Mann-Whitney non-parametric test was used. Given the fact that multiple comparisons were undertaken and some of these would be expected to reach significance merely by chance, only p values less than 0.01 were attributed meaning (Table 2).

■ Social and communicative behaviour at 2–3 years of age

The ASD-group scored higher than the DD-group (which means that they lacked more expected behaviours) in all 15 tasks. The two groups were not perfectly matched, as the ASD-group’s mean in receptive language was significantly lower than the DD-group’s, and the ASD-group’s mean chronological age was a few months higher than the DD-group’s age (39 months versus 34), which was not a statistically significant difference, but still a difference that could be important when dealing with very young children. Both chronological age and receptive language were controlled for by regression analyses. Then, the results were compared by Mann-Whitney non-parametric test. The result showed a significant difference on 7 of 15 measures. The significant (lacking) behaviours were: “Smiles in response to a smiling face”; “Responds to his/her name”; “Follows pointing”; “Looks to read faces for information when teased”; “Initiates requesting non-verbal behaviour (Joint Attention)”; “Joins functional play with miniature toys (with an adult)” and “Initiates requesting words/sentence” (Table 3).

Discussion

The aim of the present study was to identify social, communicative and imaginative behaviours that could be helpful for the clinician in identifying children with autism spectrum disorders among the larger group of children referred to the clinic for “possible autism” – before the age of four years.

The results from the parent interview indicated that young children diagnosed with ASD cannot easily be differentiated from young children with other developmental disorders in the two first years of life, at least not on the basis of parents’ retrospective information. Actu-

Table 1 Developmental age in months

	Mullen Scales of Early Learning		
	ASD-group Mean and (SD) n = 17	DD-group Mean and (SD) n = 13	p
Chronological age in months:	39.5	34.3	(n. s.)
Developmental age in months:			
Receptive language:	11.1 (8.2)	20.3 (7.7)	0.002 **
Expressive language:	13.6 (9.8)	20.0 (7.1)	0.081 (n. s.)
Visual retention:	19.5 (7.5)	24.2 (6.5)	0.514 (n. s.)
Gross motor:	23.4 (6.0)	21.4 (7.9)	0.588 (n. s.)
Fine motor:	19.7 (6.4)	22.8 (7.1)	0.862 (n. s.)
T-test			

** significant differences between the ASD-group and DD-group (p < 0.01)
n. s. no significant difference found

Table 2 Early development from 0–24 months of age. – Parental information. Questions and p-values for the ASD-group compared with the DD-group

Early development from 0–24 months of age	ASD-group Mean score	DD-group Mean score	p-values
Early development (0–6 months)			
1. Did your baby smile, coo and babble in the same way as other babies?	1.59	1.23	0.320
2. Was it easy to obtain and sustain eye-contact?	1.59	0.77	0.024
3. Did you have eye-contact with the baby when it babbled and smiled?	1.59	1.08	0.121
4. Were you able to obtain a little dialogue with sounds and smiles?	1.29	1.08	0.538
5. When the baby cried, did it settle when you picked it up?	1.88	1.00	0.004**
6. Was it hard to find a way of comforting and settling the baby?	1.92	0.92	0.001***
7. Was it hard to understand the baby's needs?	1.76	1.00	0.017
8. Did the baby react normally in the first months?	1.35	1.23	0.725
9. Was the baby passive/much too easy in the first months?	1.12	1.15	0.890
10. Was the baby unsettled/inconsolable in the first months?	1.88	1.17	0.015
Later development (7–24 months)			
11. Did the child reach to be picked up if it sat on the floor or in the play-pen?	0.76	0.58	0.476
12. Was the child afraid or wary of strangers (did it react to being handed to a lesser known person?)	0.88	1.00	0.742
13. When the child needed something out of reach, e. g. toy, soother or food, did it indicate that it needed help?	0.47	0.77	0.385
14. Did the child attempt to start a game dropping things, e. g. dropping toys from the high chair?	1.29	0.77	0.152
15. Did the child show and share enjoyment about toys or other things?	1.06	0.92	0.672
16. Did the child show you things, which were new or particularly interesting?	0.24	0.46	0.333
17. When you visited a new place, e. g. a playground and the child was out of reach, did it return to check you were still there?	0.76	0.54	0.433
18. When mum/dad left and returned, did the child show happiness, e. g. by running up to meet you?	1.24	1.15	0.891
19. Did the child use gestures, e. g. shaking its head?	0.76	1.54	0.450
20. Did the child imitate gestures, e. g. wave goodbye or pat-a-cake?	1.18	1.15	0.909
21. Did the child react to his/her own name by turning around, looking up?	0.76	1.15	0.229
22. Did the child play "pretend play", e. g. with a doll's cup, a telephone?	0.59	0.69	0.703
23. Did the child imitate sounds, simple words?	0.82	0.69	0.687
24. Did the child use sounds or words to attract your attention?	0.29	0.85	0.085
25. Was the child interested in exploring things/its environment, e. g. the kitchen, cupboards?	1.47	1.62	0.665
26. Was the child preoccupied by certain things?	0.41	0.54	0.665
27. Was the child dependent upon things happening in the same way each time?	1.18	0.62	0.108
28. Did the child react abnormally to sounds?	0.65	0.92	0.418
29. Did the child have eating problems, e. g. difficulties managing the transition to solids?	1.18	0.92	0.498
30. Did the child exhibit specific finger and hand movements (or other movements stereotypes)?	0.82	1.77	0.004**
31. Was there anything in particular that worried you about your child and its behaviours and reactions?	0.35	0.11	0.232

Higher mean score means more normal behaviour; Mann-Whitney non-parametric test; Asymp. Sig. (2-tailed); ** p < 0.01; *** p > 0.001

ally, significantly fewer parents of the children in the ASD-group found it difficult to find ways to comfort and settle their child during the first six months of life – compared to the parents in the DD-group. This may support Osterling and Dawson's [20] finding that some autistic children show a seemingly normal development during the first year of life. Significantly more parents of the children with ASD reported "finger and hand movements (or other movement stereotypes)" in the second year of life. Even if repetitive and stereotyped behaviours are present in almost all severely developmentally delayed children, the degree to which children with social and communicative disorders exhibit these features is higher (for a review see [10]). Cox et al. [12] found hand and finger mannerisms in 20 month old children with ASD, but only in children with "narrow autism",

and only within 25% of these. The ASD-group in this study consisted mainly of children with "narrow autism" (14 out of 17). Hand and finger mannerisms were seen in 9 of the 17.

The fact that it proved so difficult to discern distinguishing features within the first two years of life may reflect the reality: that it is not so readily possible to ascertain autistic disorders in the very early development. However, the identification of only three differentiating behaviour patterns between the ASD- and the DD-group could be due to a number of factors. Firstly, even if the children were no more than 2–3 years old at the time of the interview, biases in the recall of information by parents could still occur. As mentioned, parents submit their information retrospectively. Secondly, some of the questions related to very specific deficits or deviations

Table 3 Social and communicative impairments in 2- and 3-year-old children. Observation in a semi-structured interactive play session. Questions and p values for ASD-group compared with the DD-group

The observed social and communicative tasks	ASD-group Mean score	DD-group Mean score	p-values
Social interest and interaction			
1. Smiles in response to a smiling face	0.41	1.54	0.031 *
2. Shows affect attunement	0.35	1.46	0.113 n. s.
3. Participates in turn-taking routines	0.75	1.85	0.068 n. s.
4. Responds to his/her name	0.71	0.85	0.020*
Non-verbal communication, Joint Attention and Imitation			
5. Follows pointing	0.53	1.85	0.015*
6. Social imitation	0.44	1.77	0.113 n. s.
7. Looks to read faces for information when teased	0.24	1.46	0.008**
8. Social referencing in ambiguous situations	0.35	1.85	0.053 n. s.
9. Initiates requesting non-verbal behaviour	0.35	1.38	0.001***
10. Initiates declarative non-verbal behaviour (Joint Attention)	1.47	1.75	0.053 n. s.
Body contact			
11. Seeks body contact with parents	0.65	1.75	0.744 n. s.
Functional and imaginative play			
12. Joint functional play with miniature toys (with an adult)	0.24	1.00	0.048 *
13. Joint imaginative play (with an adult)	0.47	1.77	0.536 n. s.
Communicative language			
14. Initiates requesting words/language	0.29	1.62	0.012*
15. Initiates declarative words/sentence	0.12	0.92	0.499 n. s.

Higher score means more normal function; results corrected for chronological age and receptive language by regression analysis and following compared by Mann-Whitney non-parametric test; Exact. Sig.; * p < 0.05; **p < 0.01; ***p < 0.001; n.s. no significant difference found

in behaviours, not to the more familiar developmental milestones that parents pay attention to. In addition, parents selectively recall the first, or perhaps single, time when the child smiled back or pointed, but are possibly less likely to recall the numerous times when this would have been expected, but did not occur. Lord and Risi [17] found that when a very young child does not look at a parent, the parent often simply moves into the child's field of vision without registering that she/he has done so. When later asked about the child's eye contact these parents may not report any difficulties. Thirdly, the parents in the DD-group seemed – in relation to most questions – as worried as the parents in the ASD-group. All the children were referred for “possible autism”. The parents' equal worries might have obscured an actual difference between the children with ASD and children with other developmental disorders during the first two years of their lives. This might be the explanation that we were not able to reproduce several of the behavioural characteristics of autism before the age of three found by Gillberg et al. [14].

It appears easier to distinguish children with ASD from children with other developmental disorders from the age of 24 months, at least for professionals in a clinical setting. The present study indicates that on the basis of a professional observation in a semi-structured play interaction, the above groups could be distinguished on 7 of 15 tasks. These included the following: smiles in re-

sponse to a smile; responds to his/her name; follows pointing; looks to “read” faces for information when cheated; initiates requesting non-verbal behaviour; joins functional play with miniature toys with an adult; initiates requesting non-verbal and verbal behaviour.

These findings support a number of the studies outlined in the introduction. The findings are very similar to those of Lord [16] whose study also comprised 2- and 3-year-old children, and also used a control group of children with other developmental disorders. Initiating requesting non-verbal or verbal behaviour differentiated the two groups, while initiating declarative non-verbal or verbal behaviours did not. The explanation might be, as pointed out by Lord [16], that both groups of children have not yet reached the developmental level for initiative to declarative behaviours.

However, this study's weaknesses regarding data collection set limits for generalizations. The study did not use standardized, validated measures and there was no reliability check concerning the parents' ratings and the assessment based on observations, but highly skilled professionals performed the interviews and observations. The ICD-10 diagnoses were without any use of standardized diagnostic instrument but based on the usual clinical observations and assessments. However, even if not applicable to all children with ASD the study can give interesting and useful information from a clinical point of view.

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