Disorganized rhythm and synchrony: Early signs of autism and Rett syndrome

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Abstract

We interpret early age-related developments in intentions and socially responsive behaviour with data from home videos of infants who later develop autism or Rett syndrome. Detailed evidence is given from a micro-analytic study of videos of monozygotic twin girls at 11 months, one of whom became autistic in the second year. Changes in this twin’s attention, motor tonus, initiative and emotion reduce her prospective control of movements and her anticipations in awareness compared to her sister. These changes were reflected in the child’s asynchronous social behaviour, which frustrated the father’s attempts to support her attempts to walk, share toys, or play a game, confusing his anticipations, and this further reduced mutual attention and joint activity. Observations of the development of girls with Rett syndrome in the first year reveal changes in motor coordination, attention and communicative initiative, indicative of a failure of intrinsic core brain regulations of neural development and conscious activity. Notwithstanding that the two conditions show clear differences in both brain growth and early development of skills and sociability, the first signs of autism and Rett syndrome have important similarities. We conclude with recommendations for an approach to early diagnosis and treatment, applicable for the whole range of developmental brain disorders, including Rett syndrome and autism, that attempts to identify residual capacities for sympathetic motivation and collaborative learning—an approach that deliberately tries to support weakened rhythmic impulses for motor, perceptual and communicative functions in the growing infant brain.

Keywords: Autism; Rett syndrome; Infancy; Intersubjectivity; Therapy

1. Age-Related developments in brain systems for action, awareness and communication in infancy

In early weeks, the mother can be described as an ‘external regulator’ for a baby’s vital functions and state of arousal [1], but this is not all. She helps the baby be at ease with a brain and a body that, while growing rapidly, are seeking to engage the world and other people with prospective awareness. From the start a young human seeks playful ‘intersubjective’ communication of purposes and interests. He or she gains pleasure, encouragement and stimulation for development from reciprocating with rhythmically expressive responses of playmates [2–4].

The emotional attachment between parent and child is a sharing of playful ‘companionship’, not just provision by the adult of care and protection necessary for the infant’s physiological and emotional well-being [5].

Sometime during infancy, an autistic child or one with Rett syndrome loses some of the impulses and awareness that make this active relating flourish. Special forms of communicating and sharing of experience are required to compensate this loss. All developmental brain disorders challenge the affections and hopes of parents, as well as the expectations all teachers have that a young child will be eager to share learning and the development of skills.

The responses of girls with Rett syndrome to sensitive support for their expressions of inner motivation, for example in interactive music therapy [6], support this conception of the prenatal origins of human intelligence in temporally patterned motor coordination and intersubjective sympathy [7]. The early postnatal development of Rett syndrome shares features with that of autism, and both can be clarified by comparing them to the normal pattern [8–10].
1.1. Post-natal steps to understanding with others

In normal development there are predictable age-related events in the first year [11]. Each of these opens new perceptual preferences and interests. There are ‘periods of rapid change’ in strength, sequencing and versatility of motor activity, in posture and locomotion, and in the ways infants seek or react to events or objects to which they direct attention, or how they attempt to seize hold of and explore things with hands or mouth. There are particularly important changes in attention to other persons, most notably a seeking for ‘protoconversational’ play in early months, and development of a cooperative understanding of intentions, interests and feelings after 9 months that initiates cultural learning [12]. All these intrinsically triggered ‘morphogenetic’ advances are preceded by periods of vulnerability to environmental stresses.

The causal relations between morphogenetic processes emerging and shaped within the brain and effects from the environment that are mediated by the stimuli arising from behaviour, and especially from interpersonal behaviours, are two-way and complex [13]. The newborn brain is ‘environment expectant’ for just these stimulations. We can relate only two or three of the major age-related events in the central nervous system of an infant to developments in psychological function and activity during the first year and their disorders [11,14]. The most notable changes are around birth, 3–4 months later, and toward the end of the first year. Temporal, parietal and frontal lobes grow disproportionately after infancy, changing the shape of the brain [15]. Their surges of development correlate with changes in motivation for social life and for seeking experience; they are cortical components that augment the powers of two ancient neural systems of emotion: curiosity and imaginative play. It is the time for accelerated learning ‘delayed imitation’ of purposeful actions, and cooperative and imaginative play. It is the time for accelerated learning of language, for development of narrative memory, and for imitating conventional strategies for understanding and acting. It is also the time of the most rapid growth of the brain, with proliferation and selection of neocortical systems that serve in the growth of experience.

Modern diagnosis of autism, impelled by prevailing theory of acquired processes of mental representation to see development of cognition as the foundation for psychological growth, refines Kanner’s definition with respect to disturbance in the experimentally defined coherence and regulation of perception, thinking and strategies of task performance [22–26]. But the special significance of the interpersonal factors, which were identified as causal by Kanner, cannot be ignored. There is agreement about the social detachment, retarded language and obsessive behaviour of autistic children. Together, these point to a failure in the integration of motives to move in purposeful ways with self-awareness, and also to difficulties with intuitive awareness of other persons’ motives and states of mind. The processes that make these functions possible are not explained by cognitive neuroscience.

An autistic child does not seek novelty in creative, meaningful ways and want to share it, as does a typically developing infant or toddler. Thus a shadow is cast over the world other people understand together. Most importantly, the ‘detached’ behaviours also contribute to the confusion others feel who expect to share experience of discovery and invention in play with a child. They cause a loss of sympathetic engagement, which routine tests of ‘executive intelligence’ or ‘theory of mind’ may not measure.

Autistic children show a difficulty with perception of part–whole relationships, and with planning purposeful activity or problem solving. Any such diffusion of conscious self-awareness interferes with sharing of games and tasks with other persons. It prevents the ‘mirroring’ of others’ intentions.

By the third year, the levels of language and of cognition or intelligence are generally lowered, but vary widely. About 3/4 of autistic children are assessed as mentally retarded [27]. While some autistic children are fluent speakers, about half are not talking at 5 years. As a result of their weakened motivation for interpersonal contact or sharing experiences and purposes, those autistic youngsters who do speak do not manage well what language teachers call the ‘pragmatic’ function of language—its interpersonal or social usage.

2. Development of autism

2.1. Changes in self-awareness, disturbed movements, and detachment from other people

Autism affects how a developing person moves and responds in the environment—both the physical one of objects, events and places, and the interpersonal or social one. It disturbs the development of interpersonal sympathy and collaborative action, and interferes with cultural learning and with sharing ‘common sense’ of the world, in community [17–21].

Kanner [17] identified the age of appearance of ‘infantile’ autism as ‘before 30 months’. This is a crucial stage in a child’s progress from preverbal communication, to increasing mobility and social self-consciousness, ‘delayed imitation’ of purposeful actions, and cooperative and imaginative play. It is the time for accelerated learning of language, for development of narrative memory, and for
effective for many children. Autism is often not diagnosed until children reach 3–4 years. Yet 50% of parents of children with autism report that they suspected a problem before their child was 1 year of age.” [29, p. 157].

It is not surprising that unusual social interaction, imitation, play and non-verbal communication, to all of which parents are normally highly sensitive, are more reliable indicators of a positive diagnosis of autism before 4 years than an insistence on sameness and preference for fixed routines. The odd emotions of the child may give rise to concern. Displays of irritability, temper tantrums and self-injury tend to be abnormally intense and persistent by around 2.5 years in children who later develop autism.

Movement signs are among those first detected [30,31]. An infant who later is definitely autistic may have been hyperactive and involved in strange ritualistic gestures, hand-flapping, blinking, fiddling with things, repeatedly tapping, when they were less than one year old. The infant is likely to have postural weakness and be delayed in motor milestones, such as standing and walking, and may have peculiarities of gait, such as ‘toe walking’. Autistic toddlers do not point communicatively and may not understand the gestures others use in attempts to direct their attention.

The delay between parental concern and clinical diagnosis indicates that early signs may often be felt by parents before identification can be made according to normative evaluations of signs and symptoms in behaviours observed clinically, outside the home.

The Checklist for Autism in Toddlers (CHAT) [32] assesses ‘protodeclarative pointing’ (pointing to share interest in an object), ‘gaze monitoring’, and ‘pretend play’ skills. Children who show impairments in these three areas at 18 months had an 84% chance of receiving a diagnosis of autism at 3 years of age [33]. But the selected behaviours are such that they can only be used to assess development in or after the second year [34].

Attention is turning to more comprehensive descriptive analysis of the quality and frequency of spontaneous and reactive behaviours in video of infants at home, with a focus on developments in the first year, and comparison to normal development [28,29,35–40]. Maestro et al. [41] have shown evidence from home movies that in the first 6 months there may be a deviant development of the coordination between interest in objects and interest in people in ASD. Autistic one-year-olds fail to look at others’ faces with attention to their eyes, and they do not smile reactively, or act to attract others’ attention or make gestures of pointing and greeting. Their play with parents is both less attentive and less joyful, lacking quick anticipatory reactions to behaviour of a teasing kind that babies generally take delight in after about 6 months [40].

An early sign detected by parents and shown in home movies is a slow response to the child’s name [42]. Typically, developing children often turn to their own name by 6 months. The very young ASD child may also mouth objects a lot, and withdraw from touch. One-year olds with ASD look at others less frequently and fail to orient to their names in comparison with infants showing mental retardation, and both groups make more repetitive movements and do not use gestures or follow others’ use of objects as much as typically developing infants [28]. Some children with ‘late onset’ ASD demonstrate first clear signs of failure in shared awareness and cooperative purposes around 18 months or 2 years.

Psychodynamic clinicians [43] have identified problems with ‘body image’ and representation of bodies and their parts in young children with autism. Their observations alert us to the importance of coherent and flexible regulation of the postures and displacements of limbs and the special senses for efficient conscious control of action. There are associated problems with visceral and autonomic regulations, which may also be the stimulus for odd behaviours that confuse awareness and communication with other people. Infants developing autism tend not to feel well in their bodies.

3. Different rhythms: the case of two monozygotic twin girls, one of whom later develops an autistic disorder

Home video recordings of two 11-month-old monozygotic twin sisters were subjected to micro-analysis. Twin A was later diagnosed as autistic at age 18 months according to ICD-10, while Twin B had a normal development.

3.1. Videos 1 and 2: the monster game

Time-coded video tapes of two face-to-face interactions in the children’s bedroom, one of the developmentally normal girl and her father playing a ritualised teasing game, the other featuring her twin sister playing the same game with their father, were analysed to produce graphical representations of the interactions.

3.1.1. Method

Video clips of comparable duration (Twin A, 52 sec.; Twin B, 65 sec.) were selected to show good views of each subject in face-to-face play with the father while he was attempting to engage the child in a ‘Monster Game’, in which he humorously builds up excitement with repeated looming in and growling noises to the climax of nuzzling and ‘biting’ the child’s stomach. With Twin A, the father chose to lift the girl from her cot and hold her up in front of his face. With Twin B he played the game while leaning over her as she lay back down on a mattress at table height. The tapes were electronically time-coded and a computer-controlled video logging system driven by this time code was used to chart the details of the interactions to a resolution of 0.04 s.

Patterns of interaction were plotted by two coders practised in microanalysis who logged categories of
interactive behaviours modified from definitions of Brazelton et al. [44] and Trevarthen and Marwick [45]. These behaviours (Table 1) were defined to identify the occurrence in time of functional states of alertness, orientation between the partners, communicative expression, emotion, body contact, and postural tension. The categories had clear boundaries, and an inter-scorer reliability of 86% or better was obtained for all of them. By scoring combinations of behaviours, periods of attention on and off the partner, anticipation and emotional build-up could be charted for each subject (Figs. 1 and 2).

We focussed on the build-up of coherent, synchronous patterns of emotional arousal and patterns of changing attention. Levels of interaction were identified by adding up the number of expressive or responsive behaviours coded for periods to an accuracy of 4 frames (160 ms). These sums were plotted as positive when accompanied by attention directed to the partner, and negative when attention was away from the partner.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Categories of behaviour for micro-analysis of the video</th>
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<tbody>
<tr>
<td>Father</td>
<td>Twin A and Twin B</td>
</tr>
<tr>
<td>With both infants</td>
<td>Laughing (including gurgles)</td>
</tr>
<tr>
<td>Speaking</td>
<td>Smiling</td>
</tr>
<tr>
<td>Vocal Others (‘ooos’ &amp; ‘aaahhhs’)</td>
<td>Intent looking</td>
</tr>
<tr>
<td>Monster growl (noise alone)</td>
<td>Looking Away</td>
</tr>
<tr>
<td>Monster Belly Blow (noise and belly blowing)</td>
<td>Expectant Looking</td>
</tr>
<tr>
<td>Smiling</td>
<td>Eyes Closed</td>
</tr>
<tr>
<td>Intent Looking</td>
<td>Eyes Half-Closed (at peak period of the game)</td>
</tr>
<tr>
<td>Dull Looking</td>
<td>Reaching</td>
</tr>
<tr>
<td>Looking Away</td>
<td>Touching</td>
</tr>
<tr>
<td>Eyes Closed</td>
<td>Turn Head Towards</td>
</tr>
<tr>
<td>Reaching</td>
<td>Turn Head Away</td>
</tr>
<tr>
<td>Touching</td>
<td>Hand to Mouth</td>
</tr>
<tr>
<td>Adjusting Baby’s Posture</td>
<td>Tense Up</td>
</tr>
<tr>
<td>Picking Up</td>
<td></td>
</tr>
<tr>
<td>Turn Head Towards</td>
<td></td>
</tr>
<tr>
<td>Turn Head Away</td>
<td></td>
</tr>
<tr>
<td>Kiss</td>
<td></td>
</tr>
<tr>
<td>With Twin A onlya</td>
<td></td>
</tr>
<tr>
<td>Lifting Towards</td>
<td></td>
</tr>
<tr>
<td>Lifting Away</td>
<td></td>
</tr>
<tr>
<td>Head Towards</td>
<td></td>
</tr>
<tr>
<td>With Twin B onlya</td>
<td></td>
</tr>
<tr>
<td>Looming Towards</td>
<td></td>
</tr>
<tr>
<td>Looming Away</td>
<td></td>
</tr>
</tbody>
</table>

a These behaviours were different in the two games, but they served the same purpose, namely to bring father and baby closer together and then farther apart again.
a Defined by “open-mouthed or expectant half-smile with fleeting smiles, face bright with wide eyes, intent looking but with frequent saccadic movements—i.e. fleeting periods of lidding, blanks, and dulling intensity of regard”.
a Defined as “neck tense and arched, chest in and back arched, limbs brought in close, small jerky movements”.

We were interested to find if the behaviour of the girls could be described as different, and we looked for effects in the actions of both partners, father and infant. We examined how the father adapts to the behaviour of his daughter in each dyad. We treated the dyad as a clinical unit. For this purpose, as Stern puts it, “the issue of primary responsibility is minor when present at all … the organism of interest, the ‘patient’, is the dyad” [46, p. 127].

We compared the timing of behaviours with the phrasing expected in an ideal ‘cycle of interaction’ of Brazelton et al. [44], or ‘narrative cycle’ comprising phases of ‘initiation’, ‘orientation’, ‘acceleration’, ‘peak of excitement’, and ‘deceleration’.

3.1.2. Findings

Given that the girls were viewed by the parents as identical, any differences in behaviour would most likely be attributable to situation induced changes in prenatal brain development of the girl developing autism, but the intuitive responses of the parent would also be important. Differences between monozygotic twins do result in different parenting from early infancy [47].

Strong patterns of mutual-regulation were clearly present in the dyadic interaction with the developmentally normal twin B. Here the game cycle is almost identical to the flow of stages described by Brazelton et al. [44], showing coherent temporal regulation, with father and daughter giving and receiving cues in synchrony and alternation. The dyadic interaction involving twin A (the autistic infant) lacks any of the rhythmic form, built on mutual regulation, described above.

Graphs of the interaction patterns and of states of attention, anticipation and emotional build-up show the following.

3.2. With Twin B

Expected signs of reciprocal regulation of the game with the father were shown by the normal twin, in clear cycles of attention, anticipation, change in emotional arousal, and in exchanged expressions of enjoyment and teasing (Fig. 1). Each build-up of excitement by the father is marked by anticipatory behaviour on the part of the infant. For this anticipation to take place a sympathetic regulation of arousal, via communication of emotion states, is necessary. Mutual regulation of the focus of attention and tracking of the level of expression by both members of the dyad is required in a dynamic feedback system.

3.3. With Twin A

There were no signs of anticipation or build-up of emotional arousal levels in the interaction with twin A (Fig. 2). The autistic twin showed very little eye contact, a complete absence of well-timed co-regulation, no coherent engagement of mutual attention, no anticipation, and no
emotional build up in shared intersubjective phases. The dyadic interaction with twin A was characterised by long blank periods lacking in shared experience, broken only fleetingly by expressions of pleasure. These expressions were more easily interpreted as responses to physical stimulation from the father’s actions on the baby’s body than as anticipated intersubjective events. Her smiles and laughter were short, reflex-like reactions, and they did not monitor the father’s expressions.

It was concluded that:
- For the normal twin the game is enjoyed in synchrony and with cyclic reciprocation of expressions; it was a social, intersubjective event produced by shared intentions.
- For the autistic twin the sequence is not really an interaction, or, according to Stern’s [46] definition of mutual reciprocity, it is not really a ‘game’ at all.

![Fig. 1. The father’s monster game with Twin B.](image1)

![Fig. 2. The monster game with Twin A.](image2)
3.3.1. The father’s styles

In his attempts to engage his autistic daughter, Twin A, the father receives no reinforcement for the interpersonal elements of his behaviour, as he does consistently from the developmentally normal twin. The absence of these normal, regulated social rewards affects the father’s style of interaction. With the autistic twin he misses the stages of shared tension and emotional build-up. He resorts to repeatedly stimulating the infant in attempt to engage her.

4. Other videos showing developments in movements and attention

Three other video clips furnished additional evidence on differences in the behaviour of the two girls and corresponding differences in the communications and actions of both father and mother. Full details of the microanalyses of these videos will be presented elsewhere (Daniel, St Clair and Trevarthen, in preparation).

4.1. Video 3: a family scene with toys

This video was taken by the mother in the living room with a number of family members present, watching television. The father is seated on the floor with the twins seated near him. A frame-by-frame narrative description was made of the postures, movements and communicative behaviours and reactions of both girls, and of the father’s actions and comments. The mother is making the video and her comments recorded by the camera are also transcribed. This video covers 1 min 20 s.

4.2. Videos 4 and 5: the father encourages the girls to walk

The father supports each of the girls, Twin B and Twin A respectively, and tries to get her to walk for the camera. He tries to assist her balance and forward progression. The tapes are of comparable duration: Twin B = 43 s; Twin A = 41 s. As before, we made a detailed, frame-by-frame account of the behaviours of each girl, including the father’s behaviours and comments and the mother’s comments.

4.2.1. Differences in the behaviours of the twins, and of their parents

The five videos confirm that Twin A is falling behind Twin B in development of her purposeful movements, her monitoring of the environment and her engagement with her parent’s purposes and feelings. In detail, her maintenance of posture, reaching and grasping, stepping out with placing of the feet to walk, and looking about to keep track of events and to select new objects for attention are all affected. Her emotional expressions are weak and static, and because they are not accompanied by close watching for others’ interests and feelings, appear flat and ‘mechanical’. The differences are such as not to be attributable to transitory fatigue or illness. They are indicative of abnormal brain function affecting core integrative and motivating processes.

Both parents, while they treat both girls with affection and try to aid them, have developed different expectations for A and B. When the father is interacting with Twin A in the ‘game’ (Video 2; Fig. 2) he is not expecting to develop long episodes of collaborative activity. He tends to be more reactive to her, and to ‘stimulate’ with repeated invitations to respond. With Twin B (Video 1; Fig. 1) he is inviting and acknowledging shared purposes and experiences. With Twin A his utterances are more directive, like those of a parent interacting with a child less than 9 months of age [48].

In the family scene where the father is offering to play with the girls as they are seated with him on the floor (Video 3), Twin B is seated closer to him, reacts continuously with him, watches when he teases and shows pleasure, and he is almost constantly attentive to her. Twin A sits behind, self-absorbed, alone, looking about without clear purpose, making occasional smiles, sometimes wriggling or shaking her head. Her posture when seated, with legs turned out and feet pointing down contrasts with that of Twin B, who holds her feet up. Twin A does not look when she reaches for a toy, and seems to snatch the toy from her sister without proper intention, which makes her action seem ‘sneaky’. The parents both react strongly with laughter to this apparent ‘attack’. Twin A is surprised by their noise, and Twin B is momentarily distressed, and looks to her father and is comforted by him.

When the father is trying to help each twin to walk for the camera, he expects that Twin B (Video 4) will show her mother what she can do, and the mother’s comments indicate that she knows the baby will step out. With Twin A (Video 5), there is an expectation by both parents that, in spite of urging by her father, she will not walk but will ‘dance’ or ‘jump’. She appears to get pleasure from bouncing with her father’s synchronised lifts, jumping vigorously 35 times in 18 s, i.e. at 2 per second. Her exuberant jumping performance is much appreciated by everyone in the room, and she appears to respond with a smile to the applause. She is incapable of stepping out and placing her feet with adjustments to keep balance as her father shifts her body forward and from side to side, but a less-differentiated or complex motor activity, jumping, enabled her to enjoy sharing the experience. She tends to stand on tip toes.

5. Comparison with Rett syndrome

“Although the deficits of higher cortical functions in Rett syndrome seem most obvious and severe, the problems with the brainstem may be primary, and should be the focus of our research efforts.” [49, p. 57].
Early stages of Rett’s syndrome resemble those of autism. At around 9 months, a baby, who at 6 months was thought to be normal, but who probably was already defective in attention, initiative and motor coordination, shows distracted attention, weak posture, and poor coordination of limb movements [8–10,50,51]. She may advance through protolanguage and learn a few words, but by 18 months she will be retarded and deeply disturbed in motivation and emotions. By 2 years, the autistic and agitated emotional features pass, leaving a profound and permanent mental handicap, with a wide range of problems in development of the body and brain affecting posture, movement and autonomic regulation [10]. These developments confirm that causes of behavioural regression, which is coincident with an arrest of cortical growth in late infancy, involve the regulatory systems of the subcortex and genetic and epi-genetic influences on interneuronal connections in the brainstem and in the cortex [49,52].

In the second year the effects on voluntary action, learning of skills and arbitrary conventions and creative communication by gesture and speech are clear. Automatic ‘mirror’ reactions to the expressions of other persons and aimless movements of the body or self-directed ‘grooming’ gestures prevail. Nevertheless, evidence that some voluntary expressions, desires and preferences can be elicited by carefully paced interrogation, and that the rhythms and prosody of speech, song or music can excite facial and vocal expression of emotions and sympathetic rhythmic movements of the body and limbs, prove that sensitivity to fundamental expressions of communication remains intact.

Effective facilitation of communication and motivation in Rett syndrome engages and supports the residual impulses for action and social response [7]. Methods that employ rhythmic movement and/or music can give substantial aid with problems of attentional inflexibility, motor dis-coordination and emotional confusion [6,53]. Remarkable emotional responses to song and rhythmic actions, with improvement in the girls’ voluntary communicative movement, have been demonstrated in music therapy [54]. Such methods of interpersonal guidance or therapy have the power to give organisation to motive processes and autonomic self-regulations that have become weakened and disordered as a result of insufficient or unbalanced maturation of key monoamine systems of the reticular core of the brain [16]. The neurobiology of Rett syndrome indicates that failure of cognitive and linguistic developments is a consequence of dysfunction of brainstem monoaminergic regulators [52].

5.1. Studies of home movies

Signs of disruption in early development have been detected in health visitors’ reports (Burford, pages S3–S7 of this issue), and retrospective analysis of home videos taken during early infancy [50,51,55]. The girls show excessive patting or arm waving and jerky co-ordination by the middle of the first year, and their hand skills are below the 10–12-month level. Parents report the pre-regression period as having been ‘trouble-free’ in contrast to the regression phase, though in retrospect some parents do report on concerns about their child’s development before the onset of regression. Leonard and Bower [56] found that of the 127 parents in Australia they questioned about early development, 59 had harboured concerns about their daughter during the first 6 months of life.

A recent micro-analytic investigation by Burford of 12 randomly selected home videos of infants aged 7–12 months identified problems at 7 months that were more clearly evident by the first birthday (see Burford, pages S3–S7 of this issue).

A comparative infant home video study of Rett syndrome and autism by Garreau and collaborators [57] observed differences in cognitive function and in posture in Rett infants in the second year. Both Rett and autistic infants displayed difficulties in attention, especially shared attention. Swettenham et al. [58] found that in the second year infants with autism made more shifts of attention between objects than between a person and an object, or between one person and another. The Rett infants also rarely shifted attention between a person and an object, but did shift attention between one object and another. Although the regression period of Rett syndrome is characterised by an autism-like distress and loss of accessibility to human contact, after this time the girls orient more readily to persons than toddlers who are developing autism.

6. Conclusions

6.1. Implications for parenting and therapy

We have presented evidence from home movies made by the mother that a father’s natural affectionate behaviour, responding with intuitive sympathy to the reduced motor capacities and uncertain social feedback of an 11-month-old infant developing autism, is confused by abnormal withdrawal or detachment in the infant. The autistic baby, unlike her twin sister who was unaffected by autism, did not have the regulatory motive abilities to escape this situation. If the ‘normal’, but unhelpful, feedback continues, the infant’s asynchronous motives and emergent behaviours may be further undermined. Both parents of the twins we studied clearly had learned to expect the different behaviour from the baby who later developed a full autistic disorder. How can we prevent a cycle of negative effects for such an infant? Can the problem be detected this early, and can a different platform of parental support be built on which the infant can develop play and exploration of shared experiences?

The results of ‘intersubjective’ therapies [4,21,59] and those of parenting guidance by ‘relationship development intervention’ to increase sensitivity to a child’s motives, show that advances can be achieved [60]. The supportive
platform can be found by adapting the care-giver’s response so it will key more effectively with those innate sympathetic processes for human contact and for its development [61]. These capacities are rooted very early on in the growth of the brain. However idiosyncratic, habitual and ‘hard wired’ an infant’s learned behavioural responses seem to have become, there is always the potential for change due to the inherent adaptive plasticity of the brain. But this change needs to begin from the existing foundation of still vital motor and attentional capacities, which form a child-centred, person-sensitive ‘Zone of Proximal Development’ for that child’s brain [62]. Any such ‘facilitating’ approach—used in conjunction with augmented systems of communication [63–65] and systems for educating a sense of time and structuring the environment [66,67]—would need, at it’s essence, the following:

- A sympathetic, child-centred, non-judgemental approach, avoiding reliance on a ‘check list’ diagnosis.
- Close attention to whatever the child is motivated toward, channelling interested and expressive behaviours towards rhythmic emotional interaction.
- Sensitivity to whatever mode of sensory contact the child naturally favours, for instance using gentle physical touch, or vocal exchange, rather than eye-contact, if this fits the child’s preferences.
- From the above, it follows that an affectionate caregiver, particularly one who has been in contact with the child since birth, will be the best attuned ‘therapist’ for that child.
- The emotional ‘attachment’, which is a primary motivating mechanism in any child from birth, responded to by an affectionate parent, provides the foundation for maturation of the communicative behaviours of intersubjectivity, including the fun of ritual games and eventually cooperative use of objects in the shared environment.

Parents generally recognise ‘signs’ of autism well before a professional diagnosis is made. This was the case for the family whose videos we saw. The evidence from detailed descriptive studies of children developing autism or Rett syndrome is that a neuro-developmental disorder is likely to show subtle signs very early. Given the importance of early intervention to protect the child, and the parents, from negative experiences of failed communication, a generous framework for adjusting responses to meet the child is indicated at this early stage. A focus on the dynamics and emotional qualities of non-verbal expressive behaviours is required, not a strict, research-based search for cognitive or other performance deficits. This would frame future development of more targeted and systematic procedures in therapy, and aid diagnosis, anticipating care for specific cognitive and learning difficulties that can be reliably measured by standardised and validated tests of behavioural response and intelligence, including those requiring comprehension and appropriate use of language. Parents, who often express the need for relief from their ‘early frustration’, and a desire to find, ‘some way of being with their child’, can be guided to relax their manner of responding, using feedback, possibly with the aid of video recordings in the home, to become more supportive and encouraging for positive development. They will gain pleasure from a method that increases the sharing of experience and that brings happiness to the child’s initiatives. Such an approach is in accord with what we know of how the infant’s brain grows by engaging with parental affections.

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