Shaping the future of vulnerable children

Address by

prof.dr. Hanna Swaab

Professor in the field of

Assessment and Neurodevelopmental Disorders

on the occasion of the 440e dies natalis

on Monday, 9 February 2015

Universiteit
Leiden
The Netherlands

With thanks to dr. M.C. Sherwood-Smith for the translation.

Rector magnificus, excellencies, ladies and gentlemen,

Growing up is hard work! For every child, regardless of the circumstances in which he or she is being raised, it is a challenge to keep up with the multiplicity of developmental tasks that growing up demands. These developmental tasks follow one another in rapid succession. In just that first short year of your life, for instance, you are expected to develop from a completely helpless little creature that is scarcely in control of its own motor system into a child who can stand and walk and communicate, eat with a spoon, and exhibit goal-directed behaviour. By the age of 4, you must have developed sufficient skills to start school: you must be able to pay attention, for instance, and to listen. And above all you must be able to deny your own wants in favour of the demands of your environment: you must be able to stay sitting down because the teacher wants you to. Once you're at school, you face the challenge of learning to read and do arithmetic... but that's nothing to the challenge of learning to function in a way that is socially acceptable to your environment.

The necessity to keep up with all these demands makes children vulnerable as they are growing up. This makes children particularly dependent on their circumstances: they depend on their parents and teachers to provide them with appropriate learning experiences and surround them with care and attention. Not all young people grow up feeling safe and valued and benefit from the support and challenges they need to grow up to be well-adjusted, independent, healthy, and preferably reasonably contented adults.

This afternoon I would like to focus on the factors that determine the vulnerability of children as they are growing up and which have an important impact on the quality of life of the growing child and the adult that he or she will become. I will focus especially on social abilities, viewed from a neurocognitive perspective, with respect to the relation between brain development and behaviour.

In my presentation I would like to illustrate:

– That we need knowledge about neurocognitive mechanisms that support social development.

– That we should use this knowledge in the treatment of vulnerable children, children who have a hard time meeting developmental demands.

– That early detection and treatment of problems is essential; and

– That treatment should be tailor-made, based on individual assessment.

To illustrate the problems of children who can be helped by healthcare professionals, I would like to introduce you to Milan.

Milan is a little boy of 10. His parents have concerns about his development. Milan is not getting on well at primary school. His learning difficulties seem to be increasing. Reading has always been difficult for Milan, and he was diagnosed with dyslexia early on; but now arithmetic and subjects like history and geography are also more and more of a problem. He is easily distracted and low on motivation. He seems to suffer from fear of failure and tends to be withdrawn. He finds it hard to make friends with other children, is often alone, and sometimes bullied. Increasingly, his behaviour towards other children is angry and aggressive. The teacher feels she doesn't really have him in hand - corrections and guidance do not seem to have sufficient effect - and the school is wondering how best to handle him. Milan's parents have noticed that at home too he is increasingly angry and out of sorts. He gets bored easily, has few friends, seems unhappy, is often worried and anxious, sleeps badly, and frequently picks fights with his younger brother - he is also often aggressive towards him. Milan's parents are worried about these worsening problems

with his mood and about his extreme behaviour. They worry about his future. They will go to any lengths to help their child feel happier, make friends, and do better at school. Milan's parents want to get to the bottom of the problem; they want to know what they can do to support him in his development. They recently turned to the *Ambulatorium* with their anxieties about their son. The *Ambulatorium*, part of the Faculty of Social and Behavioural Sciences, is a policlinic for matters to do with parenting and problem behaviour. It is also a facility for our students to practise clinical skills. Milan's parents had three main questions:

- What is the nature of Milan's problem, and how serious is it?
- Will this problem have impact on his development?
- Is there a proper treatment for his problem?

At the *Ambulatorium* we will carry out diagnostic tests to obtain a fuller picture of the extent of the problems and advise the parents and school about how best to handle Milan. We'll talk about his assessment later. Let me first illustrate how we will address his problems.

It is clear that circumstances influence the outcome of the process of growing up, but it is important to remember that a child's disposition and abilities are also an extremely important factor in determining developmental outcomes. Biopsychosocial models help us to reflect on the dynamics of how behavioural problems come about. The Social Cognitive Integration of Abilities model (SOCIAL), developed by Beauchamps and Anderson, provides us with a framework within which to study social development. The model's strongly neurocognitive orientation fits well with our line of research.[1]

Neurobiological factors influence the development and functionality of the brain. Abnormalities in neurocognitive functions - the cognitive functions with which we direct behaviour - are connected with problem behaviour.

Neurocognitive problems influence the individual's environment, and the environment in turn influences the development of the problems in question and the development of neurocognition. Naturally the influence from the environment also depends on the characteristics of that environment and the complex interactions between various environmental influences. Here we are talking about the family environment, for instance, but also school, friends, social and economic situation, and cultural characteristics, all of which influence the child's development. Vulnerability in the developing child is determined by the balance between the interacting systems at various levels, and by risk factors and protective factors. Development is the result of an ongoing interactive process in which children constantly attune themselves and adapt to the demands of their environment, whilst at the same time influencing that environment, drawing on the palette of abilities made available by their disposition. Protective factors, both in the child's disposition and environment, can ensure that risk factors are not detrimental. If a child's family has a good social network, for instance, this can be a favourable factor as the child is growing up, and can function as a protective factor to counteract a risk factor in the child's disposition such as difficulty in making social contact.

A child like Milan has great difficulty in meeting the challenges of everyday life. He has trouble learning at school and experiences problems with social interactions. His development is clearly different from that of other children.

It is important to establish whether this impaired development has a severe impact on the child's day-to-day functioning and thus impinges on or threatens the normal course of development; in this case we speak of psychopathology. If the problems are serious it is customary, in analogy with the medical paradigm, to categorize the psychopathology syndrome-specifically, in accordance with the criteria of the *Diagnostic and Statistical Manual of Mental Disorders*, the DSM, recently published in its 5th , revised edition.[2]

If the developmental problems are clearly related to dispositional factors, such as genetic or neurobiological factors that have had a structural influence on the development and functioning of the brain, and this has resulted in certain developmental tasks not being properly mastered, then, according to DSM-5, we are dealing with a 'neurodevelopmental disorder'. These are disorders in which the individual will - to a greater or lesser degree - experience the impact of his or her disposition as a limiting factor throughout life. Examples include intellectual disabilities, language and communication disorders, motor disorders, ADHD, autism spectrum disorders, and severe learning difficulties.

The system of classifying psychopathology in accordance with the DSM is important in that it provides a globally standardized set of categories and designations for these conditions. But to a certain extent this classification is at odds with dynamic thinking about development, because the ordering is fundamentally dichotomous: either you have the disorder or you do not. Moreover, the inherent risk of thinking in terms of syndromes is an excessive focus on sketching the contours of the problem behaviour. This makes it all the more important not to lose sight of the underlying dynamic of that behaviour. Because if we can tease out how the problematic development arose in the first place, precisely this will open up opportunities for tackling the problems and for stimulating the healthy aspects of a child's development. So I advocate effective assessment and diagnosis for the purpose of devising the best treatment strategy, regardless of classification.

To be able to adequately support parenting in the case of behavioural problems we need research that generates knowledge about the association between characteristics of the child, environmental influences, and problem behaviour.

Knowledge about the mechanisms underlying problem behaviour, about risk factors and protective factors and the effects of interaction between them, forms the basis for structuring the individual psychodiagnostic process when, as in the case of Milan, for example, parents turn to the *Ambulatorium* for guidance. A diagnostic assessment for an individual child and his or her parents is structured on the basis of hypotheses about connections between behavioural problems and underlying mechanisms and risk factors. So the diagnostic assessment results in an individual profile of weak and strong factors in the child's disposition and environment, which are interpreted in connection with one another. On the basis of these connections, an individual theory is drawn up to explain what lies behind the problems of this particular child, and this enables us to devise a tailor-made approach. So the aim of the individual assessment and diagnosis is always to ensure that the treatment strategy is as effective and efficient as possible.

Perhaps you're wondering why we couldn't simply proceed with treatment without carrying out this kind of tailor-made diagnostic assessment and analysis - after all, you may well assume we could decide on the right approach on the basis of the syndromic characteristics, i.e., on the basis of symptoms or behavioural problems. This is indeed a valid question. And it is a question also frequently posed by the policymakers responsible for structuring care for children with behavioural problems, such as Milan. The process of assessment and diagnosis takes time, and thus costs money. My answer is that we need tailor-made approaches because, due to the interaction between disposition and environment, apparently similar problems and symptoms can have very different underlying causes. A great many different skills are needed, for example, for someone to exhibit socially appropriate behaviour, and it is important to know which of the contributing factors may be playing a role in a specific child, so that the intervention strategy can be focused on those factors. In the course of the diagnostic process we use specific tasks to gain insight into cognitive and neurocognitive functioning, so that we can draw up the individual theory that forms the basis for the tailor-made approach.

If you initiate treatment without finding out which underlying mechanisms have led to a specific set of problems, if you proceed merely on the basis of untested assumptions and explanations, you run a substantial risk of embarking on an expensive course of treatment that will not deliver the desired results. In this way the treatment is not only a waste of money, but also of precious time during the child's development process. The longer a child does not receive appropriate treatment for his or her problems, the greater the impact they will have on his or her development as a whole; after all, children develop at great speed, and the stages of development build on one another. The next step in the child's development is usually dependent on the quality of the preceding step, so a timely, effective intervention can possibly also prevent the problems from becoming more severe.

The basis for tailor-made treatment lies in a theory-led assessment and diagnosis process. What makes efficient assessment and diagnosis possible is knowledge, which means research into the mechanisms underlying a given constellation of problems. And this is extremely important for the quality of care.

Let's take a closer look at the social development of children and the related developmental risks.

Social skills are a fundamental characteristic of how human beings function and are extremely important if we are to form relationships and participate in society in any meaningful way.[3] Social adaptive functioning is complex, which makes it a very vulnerable aspect of development. Problems in developing social skills are strongly associated with psychopathology. Autism, whose key symptom is social problems, is a good example of this. But problems in developing social skills are also associated with an increased risk of aggression and of antisocial and criminal behaviour.[4] To display socially appropriate behaviour one has to be able to pick up social information and respond appropriately to it, and this depends on the meaning we bestow on this information.

You need a whole range of skills to respond in a socially appropriate way:

- You have to be sensitive to essential social signals, so you need to be able to select effectively from the mass of information.
- You have to be able to take the context into account in interpreting the signals.
- You have to be able to process that information quickly, because social situations are inherently dynamic.
- You have to be able to predict the effect of your behaviour on another. For this you need theory of mind, the ability to put yourself in another person's shoes; this is also known as cognitive empathy.
- You also need affective empathy: the ability to empathize with the other person, to experience the other's emotions.
- You have to be able to control your own emotions, to have self-control and self-regulation at your command.

Understanding social information depends on the functioning of a complex network in the brain, often referred to as 'the social brain'. This network develops rapidly during childhood and adolescence due to maturation and exposure to the social environment. The efficiency of this network and its associated neurocognitive functions improves with age. This is why children of different ages are so different. And the development of neurocognitive functions can also be disrupted. Generally speaking, we distinguish three different areas of neurocognitive functions that are relevant in social functioning:

- Social cognition, the ability to perceive social information and give meaning to it.
- Emotion recognition, empathy, and emotion regulation.
- Self-regulation

Some aspects of each area of neurocognitive function will be discussed to illustrate that social problems can result from various causes.

The ability to perceive social information and give meaning to it is highly dependent on social learning, and this starts at birth. A newborn baby has a strong innate preference for looking at faces. This attention for faces results in social interaction, which is an important prerequisite for social learning. Children automatically focus on the behaviour of others to increase their social knowledge. From the age of 6 months, a baby follows the direction of the other person's gaze. The child often directs the attention of adults by pointing at important objects. This sharing of attention is important for language development and for the development of theory of mind: the ability to understand the behaviour of others by reasoning. The ability to predict another's behaviour on the basis of this perspective-taking emerges in children's development from the age of about 4.[5] From the sixth year of life, children are generally capable of 2nd order mentalizing: what does person A think person B is thinking? This is an important step towards understanding complex social interactions.

Precisely the absence of shared attention is often one of the first clear signs of developmental problems. Not following someone's gaze and not pointing out interesting objects to draw the attention of, and thus elicit an explanation from adults is common in children with an autism spectrum disorder.[6]

There is a great deal of evidence that the quality of the early relationship between mother and child is important for the development of social skills.[7] Early interactions are important for the calibration of social cognition and self-regulation. For this reason, we are carrying out research, under the auspices of the National Initiative Brain and Cognition (NIHC), into the benefits of providing support very early in the parenting process. Our study focuses on young women who are pregnant for the first time and who themselves have developmental problems. During pregnancy and in the first 2.5 years of their baby's life, these women receive coaching in line with the programme 'Minding the Baby', developed in Yale, which we have translated as 'Een Goed Begin'.[8] The coaching focuses on improving the mother's social reflective skills, her ability to take her child's perspective. We know that such early intervention has favourable effects in the long term on the child's general health, school success, intelligence levels, and social outcomes. In our study we aim to establish which neurocognitive functions are involved for this coaching to achieve these effects.

Let me illustrate this by telling you about Lisanne, one of the young mothers participating in this programme. Lisanne is now 20. The problems between her mother and stepfather were so severe that she left home when she was 11. She has moved around a lot since then, living with her aunt for a while and with several foster families. During this time she received treatment for depression, anxiety, and eating disorders. In her teenage years she was also a victim of grooming, but she has managed to break away from these circles since then. She had a boyfriend and became pregnant by him. But he left her because she wouldn't terminate the pregnancy, and he now often threatens her. She is living in a Salvation Army hostel for mothers and children, as she is no longer welcome in her parents' house. Lisanne has few people to turn to apart from her aunt and a cousin. She is determined to be a good mother to her newborn son, Kyan, and is thinking of taking a course of study. She is receiving coaching to help her with raising Kyan. If she runs into difficulties or has any questions, she can easily reach her coach by whatsapp.

The second area of functioning is emotion. Emotions help us to navigate through the social world. Babies can already differentiate between facial expressions at the age of three months. At four months they prefer happy faces to faces that show negative emotions. Facial expressions have social meaning and even affect the observer's own emotional state. The facial expressions of others help us decide whether a situation is safe or not. Not only the emotions of others, but

also our own emotions are important for social judgements. When we experiences emotion, our heartbeat races, respiration intensifies, and perspiration increases as a signal of action potential. Our interpretation of the emotion will result in decisions about action. When it comes to making sense of social situations, we are largely led by our own experiential learning: the social scripts that we have accumulated on the basis of our life experience and that we use to interpret social information. Imagine you see two people in the distance chatting and laughing together, and every now and then they look over at you - if you are insecure, perhaps because you are often bullied at school, you may be quick to think they're laughing at you and respond accordingly, whereas if you have a healthy level of self-confidence you will be more likely to conclude that their smiles are friendly and perhaps even admiring. So, our history of social learning is important for our interpretation of social situations.

Studies in groups of children with high levels of aggression suggest that aggressive children are less sensitive to stress. A large body of research has led to the theory that these children seek sensory input that stimulates them and that they do not fear the consequences of their behaviour.[9] This entails a range of risks for these children's development, including an increased risk of anti-social or even criminal behaviour.

In our study, however, we found that there were large differences in responsiveness to stress within the group of aggressive children.[10] Children with low arousal in response to frustration were indeed more prone to aggressive behaviour in all sorts of situations. But there were also children who were highly sensitive to stress. In addition to aggression, they also exhibited fear and were aggressive above all from irritability, i.e., in reaction to circumstances.[11] For these children, precisely the speed with which they became emotionally dysregulated was shown to be an important factor in the emergence of aggressive behaviour. We also found that if children had problems with emotional understanding of social information, the risk of them exhibiting calculated aggressive behaviour was lower.[12] This shows how important it is, when drawing up a treatment strategy for aggressive behaviour, to consider the dynamic that has given rise to the aggression. It is important to know whether the child's neurocognitive functions are more in keeping with calculating, proactive aggression, or with 'explosive', reactive aggression. In the case of the former, treatment should focus on improving theory of mind and empathy; in the case of that latter, on improving emotion regulation and self-control. Making the wrong choices might even aggravate the aggression problems, so tailor-made interventions are all-important here.

The cognitive control functions, or executive functions, play a role in regulating behaviour, emotions, and cognitive processes. We need executive functions to be able to exhibit adaptive behaviour, especially in a social context. Executive functions refer to complex cognitive abilities such as 'reasoning' or 'problem-solving'. Three important basic executive functions are important for the regulation of behaviour and are therefore relevant for assessment in children.[13]

- One important basic executive function is inhibitory control. Inhibitory control refers to the ability to resist impulses or needs in favour of behaviour that is the result of a rapid weighing up of these impulses against what is fitting or socially appropriate at that moment - continuing with your exam revision, for instance, instead of choosing the more attractive alternative of having fun with your friends. Another example is managing to control your emotions in the interests of social relations: you are angry, but you control yourself and express your emotion in a socially acceptable manner, also taking into account the context of the situation and focusing on the results you hope to achieve. In fact what functioning in a socially appropriate manner boils down to is the ability to pursue

your goals while taking into account the interests and perspectives of the other - and that calls for self-regulation, which includes inhibitory control.
- A second important condition for cognitive control is working memory, which means the amount of information we can hold in our mind at the same time as processing it - so the ability to mentally manipulate information, think ahead, and plan, by organizing matters in our mind.
- A third very important basic executive function is cognitive flexibility: the ability to alter a mental strategy, take a different perspective, and shift the focus of our attention.

It is important to be aware that these cognitive control functions, which are mainly related to the prefrontal regions of the brain, mature throughout childhood and adolescence and only reach full maturity in adulthood.[14] This is one of the reasons why teenagers sometimes suddenly flare up so emotionally and may have great difficulty working out a realistic timeframe, or why young children will sometimes voice their opinions uninhibitedly or unstrategically, with no regard for the context - if with disarming and refreshing honesty. This is also why young children, but also teenagers, after a fit of anger in which they have told their parents the truth very bluntly and emotionally, assume this will have no effect whatsoever on the relationship - which is indeed the case with parents who are capable of taking perspectives and know this is all part of a child's development. In adults, incidentally, there are great individual differences in the quality of these functions, due to differences in the pace and outcome of their development.

If the development of children's executive functions is not in keeping with their age, than they may experience problems in day-to-day life as a result of high levels of impulsivity, for instance, inept social behaviour, and difficulty with organization and planning. In children with neurodevelopmental disorders such as ADHD and autism spectrum disorders, the executive functions are often not developed to an age-appropriate level.

In children with problems on the autistic spectrum the development of the executive functions is often weak, and they feel a great need for fixed patterns and predictability; they clearly have difficulty with cognitive flexibility and adaptation.[15] We contacted 175 children with autism, about 14 years on from their diagnosis, and asked about how they were getting on in their adult lives. It emerged that half of the children did not live independently once they reached adulthood, and that approximately a quarter of them required intensive care.[16] A large proportion of them had not succeeded in completing a course of study, despite the fact that these children were of average intelligence. Problems with inhibitory control were associated with a heightened risk of the most unfavourable developmental outcome, in which individuals developed severe symptoms of loss of control, such as cognitive problems and other symptoms of psychosis.[17] Studies in other groups of vulnerable children also show that the risk of loss of functioning control, of disorganization in thinking and behaviour, and of psychotic symptoms is related to the quality of the cognitive control functions of inhibitory control and mental flexibility.[18] These regulatory functions are therefore important in assessing how vulnerable a child is and can perhaps give some indication of the risks of the child developing serious problems in later life.

For vulnerable children with autism spectrum disorders, the chances of a good future are greatly improved by the dedication of organizations such as Stumass (which stands for "studying with autism"). This organization has 30 student houses in 18 different cities in the Netherlands, to provide supervised accommodation for students with autism. The expectation is that these students will be able to maximize their potential because a number of risk factors are eliminated by the supervision, which enables them to complete their course of study successfully. The Stumass students are cooperating with our scientific research, thus helping us to examine in more detail what is important for them to get the most out of their time in college. It emerges that the Stumass students

feel that they are less competent than other students; they are plagued by fear of failure. The cognitive control functions of inhibitory control, working memory, and cognitive flexibility are less strongly developed, so they experience difficulty in organizing their thoughts and actions and in regulating their emotions.[19] This is associated with social anxiety, insecurity, and an inability to assert themselves. As a result of this, these students have a strong inclination to avoid social situations. For Stumass, the immediate gains of this research are that the coaches now focus more on consciously teaching students positive thinking strategies to reduce their insecurity, and on actively teaching problem-solving skills so that the students' stress is reduced and they acquire a better control over their day-to-day functioning. This improves the Stumass students' rates of success in their studies.

What does knowledge about these three domains of neurocognitive functioning mean for the process of individual assessment and diagnosis in Milan's case? Milan has problems with social development. He has few friends, is bullied, and behaves aggressively. He has learning difficulties. The diagnostic assessment is based on our hypotheses about possible impairments in neurocognitive functions; we look closely at how Milan processes social information, his emotion regulation, and the executive functions.

The diagnostic assessment showed that Milan has problems with regulating his emotions. He is often angry and out of sorts, and has insufficient insight into the effects that this behaviour has on other people. Milan is not good at seeing things from other people's point of view and has difficulty recognizing social cause-and-effect relations. Although Milan's verbal development is strong and he shows high verbal intelligence, he is not good at interpreting non-verbal social information. He has problems taking in complex situations, like when lots of children are in the classroom at the one time. In such situations, he finds it difficult to distinguish the essential social information when confronted with so many stimuli, and this makes him stressed and insecure. This stress makes him irritable and quickly aggressive. Milan has not yet developed sufficient self-regulation to cope with this stress; he does not yet have much cognitive control. Milan has difficulty focusing and retaining his attention; he has weak inhibitory control. Thanks to the diagnostic assessment and the resulting profile of weak and strong points, it was possible to devise a tailor-made approach to Milan's problems. At school, they have made adjustments to the ways the material is presented to him. Milan's problems have nothing to do with motivation, but with the fact that he is easily distracted and finds it difficult to gain an overview. Milan needs a place in the classroom where he is confronted with fewer visual stimuli, and the teacher helps him to focus his attention by giving him shorter tasks and extra instructions. We explain to Milan's parents how his disposition plays a role in his emotional problems and how they can help him to learn to regulate his emotions. Milan is receiving a special training that focuses on teaching him social skills. His problems fit within the classification of autism spectrum disorders.

Can neurocognitive profiles help us to predict the effects of treatment?

Treatment protocols have been devised - to treat aggression problems, for instance - that work reasonably successfully. One such treatment protocol is the Parent Management Training Oregon, PMTO.[20] Parents of children who have social problems and exhibit a lot of aggression are trained to apply parenting strategies based on the principles of behavioural therapy. This type of treatment is effective in 50% of cases. It is important for us to acquire knowledge about the neurobiological and neurocognitive markers that can help us predict outcomes and thus increase the chance of treatments such as PMTO being successful.

Together with the city authorities of Amsterdam, we are working on a project that has been set up to prevent aggression and criminality in young people in high-risk categories. The

aim of this Preventive Intervention Project, the PIT project, is to investigate whether it is possible to identify high-risk children at an early stage and intervene preventively, before there are any signs of them drifting into serious aggression problems and antisocial development. The project targets the younger brothers and sisters of the top 600 habitual offenders who have committed high-impact crimes in the city of Amsterdam, as well as children who exhibit severely aggressive behaviour at school.

One of the children who meet the criteria is Wesley. He is 13 years old and has just started in his first year of vocational school. Within a few months, his teachers are starting to complain. He often plays truant, is insolent, and doesn't do his homework. He shows virtually no interest in his lessons, is socially isolated, and has little contact with the teachers. If the teachers try to correct him, he responds with verbal aggression and evasion. The teachers are very concerned about Wesley's behaviour and believe he will not succeed at his current school because of his behavioural problems. Maybe he would be better off at a special school for children with severe behavioural problems. Wesley is from a single-parent family and lives with his mother. His older brother is one of the top 600 criminals in Amsterdam and is currently doing time in prison. His older sister has a drugs problem and is unemployed. The school brings the matter to the attention of the social services, but Wesley's mother refuses to cooperate. She doesn't see the problem, has no questions about Wesley's upbringing, and doesn't want social workers around the place. Members of the PIT team pay a visit to Wesley's home and try to build up good contacts with his mother to motivate her to cooperate with help for Wesley. Because the extra help for Wesley will mainly be arranged through school, his mother gives her consent.

In multi-problem families like this, it sometimes takes a great deal of hard work to motivate parents to take on the responsibility of caring for their child. Precisely these children are in great need of our help. The families are unlikely to come to our policlinics, and yet the developmental risks for these children are extremely high. In this project the members of the care team visit the families at home and work with the children at school, and that reduces the barriers. At the school, we draw up an extensive individual profile of the child's neurocognitive skills, as we believe we need this information to optimally support the child in his or her individual development; and this is very important when they are growing up in an environment with so many risk factors.

Wesley turns out to have difficulty understanding his social environment. He has a very limited ability to interpret facial expressions: he interprets virtually all emotions he sees in other people as anger. However, he is good at thinking in social cause-and-effect connections and has good empathy skills. He is self-critical and dissatisfied with his own behaviour. His aggression and truancy seem to stem mainly from a lack of social scripts for showing alternative behaviour. In addition, he becomes anxious easily and automatically assumes other people are angry with him. This dynamic is difficult to discern without diagnostic assessment; in day-to-day dealings with Wesley the main thing one sees is aggression and evasion. Wesley's neurocognitive profile provides openings for a treatment strategy. The team draws up a plan of action with the school; the situation is improved by the fact that the teachers now understand the dynamics underlying Wesley's aggression problems. The teachers will now explain to Wesley more clearly what they expect of him. Wesley is receiving a training in social skills that is tailored to his neurocognitive profile. Wesley's mother, whose functioning is extremely problematic, is being given support so that Wesley receives more care at home, such as regular meals and an agreed bedtime. The members of the PIT team are keeping an eye on things.

By now, about 300 children are under the care of the preventive intervention team. Projects such as the PIT apply knowledge from the field of neurological child studies. On the basis of this

knowledge, the process of assessment and diagnosis is designed to reveal the dispositional factors relating to the child's social skills. The profile of neurocognitive functions shows where the individual growth opportunities for each child lie. The aim here is to increase the chance of healthy social development in children who have to develop in high-risk circumstances where there are many threat factors. These are children who have little chance of care and are highly vulnerable; children who often show extremely serious problems. In projects such as this the aim is to carry out assessment and diagnosis for the purpose of the intervention strategy; classification of the problems does not play a role. By using in-depth neurocognitive assessment and diagnosis at the start of the care trajectory, we increase the chances of the intervention suiting the child and thus being successful. The assessment and diagnosis is carried out at school, which makes it more accessible. The PIT works quickly; just four weeks after the diagnostic assessment the PIT team member can set to work with the child using the tailor-made strategy. Most of these children are shown to have problems with regulating their emotions and understanding social information; a tailor-made approach is devised for each child. PMTO, a protocol-based aggression treatment programme involving parents who are extremely motivated to help their child with his or her social development, has a 50% success rate. In the PIT project, however, a striking 70% of the children show a significant decrease in aggressive and rule-breaking behaviour one year on. This is all the more remarkable when one considers that with these children there are often very few positive influences in the child's environment to counteract the risk factors. The Amsterdam city authorities deservedly won the national Youth Care Prize for 2014 for this project.

In our view, the strength of this kind of intervention lies in early intervention: the speed, the tailor-made approach, and the optimal use of expertise at the start of the care process. Another very important factor is working together with schools. Collaboration between social workers and schools is a strong formula. Teachers have an opportunity to work on children's social development, and they need to be aware of how important this is. Both teachers and parents benefit from better insight into the dynamics underlying the social development of individual children, even when the problems are less serious than those I have outlined here.

I hope that I have illustrated that knowledge about the neurocognitive mechanisms that support the social development process is important for providing help to vulnerable children whose social development is proving problematic. The importance of early detection of social problems and timely intervention is evident: time is precious where development is concerned. I have argued that it is important to carry out an in-depth diagnostic assessment of the neurocognitive functions, since a tailor-made intervention strategy offers many advantages. When it comes to the problems of vulnerable children such as Milan, Wesley, Lisanne, and her baby son Kyan, applying knowledge about the relevant neurocognitive mechanisms can make all the difference for their future.

Notes

1 Beauchamp, M.H. & Anderson, V. (2010), Social, an integrative framework for the development of social skills, *Psychological Bulletin*, 136, 39-64.

2 American Psychiatric Association (2014). Beknopt overzicht van de criteria (DSM-5). *Nederlandse vertaling van de Desk Reference to the Diagnostic Criteria from DSM-5*. Amsterdam: Boom.

3 Caccioppo, J.T. (2002). Social Neuroscience: Understanding the pieces fosters understanding the whole and vice versa. *American Psychologist*, 57, 819-831.

4 Hawkins, J.D., Kostermans, R., Catalano, R.F., Hill, K.G. & Abbott, R.D. (2005). Promoting positive adult functioning through social development intervention in childhood: Long-term effects from the Seattle Social Development Project. *Archives of Pediatrics and Adolescent Medicine*, 159, 25-31.

5 Baron-Cohen, S. & Ring, H. (1994). A model of the mindreading system: Neuropsychological and neurobiological perspectives. In: C. Lewis & P. Mitchell (eds), Children's early understanding of mind: *Origins and development* (pp 183-207), Hove, England: Erlbaum.

6 Mundy, P., Gwaltney, M. & Henderson, H. (2010). Self-referenced processing, neurodevelopment and joint attention in autism, *Autism*, 14, 408-429.

7 Masten, A.S., Hubbard, J.J., Gest, S.D., Tellegen, A., Garmezy, N. & Ramirez, M. (1999). Competence in the context of adversity: pathways to resilience and maladaptation from childhood to late adolescence. *Development and Psychopathology*, 11, 143-169.

8 Sadler, L.S., Slade, A., Close, N., Webb, D.L., Simpson, T., Fennie, K. & Mayes, L.S. (2013). Minding the Baby: Enhancing reflectiveness to improve early health and relationship outcomes in an interdisciplinary home visiting program. *Infant Mental Health Journal*, 34, 391-405.

9 Van Goozen, S.H., Fairchild, G., Snoek, H. & Harold, G.T. (2007). The evidence for a neurobiological model of childhood antisocial behavior. Psychological Bulletin, 133, 149-182.

10 Schoorl, J., Van Rijn, S., De Wied, M., Van Goozen, S.H.M. & Swaab, H. Variability in emotional/behavioral problems in boys with Disruptive Behavior Disorders: the role of arousal, submitted.

11 Schoorl, J., Van Rijn, S., De Wied, M., Van Goozen, S.H.M. & Swaab, H. Emotion regulation difficulties in boys with disruptive behavior disorders: the role of autism, attention and aggression problems, submitted.

12 Doctoral research by Jarla Pijper; supervisors: De Wied, M., Van Goozen, S., Van Rijn, S. & Swaab, H.

13 Diamond, A. (2006). The early development of executive functions. In E. Bialystok & F.I.M. Craik (eds), *lifespan cognition: Mechanisms of Change*. New York: Oxford University Press.

14 Cogtay, N., Giedd, J.N., Lusk, L., Hayashi, K.M., Greenstein, D., Vaituzis, A.C. et al. (2004). Dynamic mapping of human cortical development during childhood through early adulthood. *Proceedings of the National Academy of Sciences of the United States of America*, 101, 8174-8179.

15 Van Engeland, H. & Swaab, H. (2011). In: Swaab, H., Bouma, A., Hendriksen, J. & Konig, C. (eds). *Klinische kinderneuropsychologie*, Amsterdam: Boom.

16 Barneveld, P.S., Swaab, H., Fagel, S., Van Engeland, H. & De Sonneville, L.M.J..(2014) Quality of life: a case-controlled long-term follow-up study, comparing young high-functioning adults with autism spectrum disorders with adults with other psychiatric disorders diagnosed in childhood. *Comprehensive Psychiatry*, 55, 302-310

17 Barneveld, P.S., De Sonneville, L., Van Rijn, S., Van Engeland, H. & Swaab, H. (2013). Impaired response inhibition in autism spectrum disorders, a marker of vulnerability to schizophrenia spectrum disorders? *Journal of the international Neuropsychological Society*, 19, 1-10.

18 Van Rijn, S., Aleman, A., Sonneville, L.M.J. & Swaab,H. (2009) Cognitive mechanisms underlying disorganization of thought in a genetic syndrome (47,xxy), *Schizophrenia Research*, 112, 91-98.

19 Dijkhuis, R., Van Rijn, S., Ziermans, T., Staal, W. & Swaab, H. Behavioral predictors of subjective quality of life in young high-functioning adults with autism spectrum disorder, submitted.
20 Furlong, M., McGilloway, S., Bywater, T., Hutchings, J., Smith, S.M. & Donnelly, M. (2013). Cochrane review: behavioural and cognitive-behavioural group-based parenting programmes for early-onset conduct problems in children aged 3 to 12 years. Evidence-Based Child Health, 8, 318-692.