

TEA THYRRE SØRENSEN

LEARNING ENVIRONMENTS  
IN DAY-CARE

## Neuropsychological Development play

This is how you support  
children's development via play

Tea Thyrré Sørensen

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1<sup>st</sup> edition, 1<sup>st</sup> circulation, 2020

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Cover design: Sisterbrandt

Publishing editor: Astrid Hjort Balle and Mette Johnsen Elbeck

Graphic production: Jypa, Frederikshavn

Illustrator: Maiken Damsgaard, © Thyrré Sørensen Consulting.

Photos: The author's own, thanks to the children from Skovslottet in Aarhus Municipality for joining.

Author photo: Mads Zaar Riisberg.



The Swan Label printing 5041 0826

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[www.skoleportalen.dk](http://www.skoleportalen.dk) – [www.dafolo-online.dk](http://www.dafolo-online.dk) – [www.dafolo-tools.dk](http://www.dafolo-tools.dk)

Item no. 8041

ISBN 978-87-7160-954-7



At Dafolo, together with others we to contribute and inspire to the fact that children, youths, and adults can learn, thrive and be.

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# Introduction

This book about Neuropsychological Development play (NPU) focuses on play development of children and above all on, how children learn to play at all. NPU is based on development of the brain and differs from other approaches to develop age-appropriate play and interaction skills. These skills do not come by natural maturation but developed through contact and interaction with an adult.

Good play and interaction skills create prerequisite to be able to enter different forms of plays with others, and these skills are best developed, when the child is part of joyful play with an adult. Therefore, the NPU focuses on the fact that it is not the play, but *the way we play* that develops the child's play and interaction skills. In other words, the contact between those who play is decisive for the effect the play has on the child. At the same time, it is different types of play that stimulates different part of the child's development, and therefore working at NPU with knowledge of, which games that easiest stimulate areas that you want to develop.

Overall purpose of the book is to give you inspiration to work with play and playful interaction, where you on a simple and effective way supports the development of play and interaction skills in the child group and thereby further developing the children community and the interrelationships among the children in the group. Thus, in the book you get overview of which play and interaction skills that are developed when, and how you best support this development through everyday praxis. There would be ideas for, how play and playful interaction can be used at different times of the day and suggestion for specific games that you can test. In addition, you get a theoretical overview of the brain's development. Through the book you get examples, which give you insight into, how NPU is used in the daily praxis, and which effect it has had on the child or children group. Special thanks to day-care Midt, Randers Municipality, and several institutions from Gribskov and Kolding Municipality to share their cases and experiences in this connection.

## Structure of the book

In the first chapter, you get an overall presentation of the theoretical basis of the book and an overview of, how trauma and affiliation affect play development of the child. Chapter 2 defines the concepts of play and playful interaction and give you overview of how play and playful interaction takes place on different on different levels of the child through the work with a playful learning environment.

This is followed by the book's three main chapters, chapter 3, 4 and 5 that are built up on the child's neuropsychological development in three main levels. Here you get overview of, which skills and competencies that are developed on different levels in the child's brain, and you get tools to examine, where the child is in their development on the different areas.

In chapter 3 about the sensing level, you get insight into how the child via play and playful interaction develops the ability for contact, energy regulation and turn taking. This is followed by Chapter 4 on the feeling level, how the child among other things develops your connectivity, you ability of emotional interaction and empathy, and in chapter 5 you get insight into how the child on the cognitive level develops the ability of impulse control, imagination and mentalisation.

Chapter 6 illustrates, how play culture can affect development opportunities of the children group, in chapter 7 there is focus on your role in the work with NPU. Here you get ideas to, how you – by working with own self-regulation and good cooperation agreements with your colleagues – establishing a praxis, where the work with NPU creates visible effect of both the individual child and the group of children. In chapter 8 you get tools to get started with NPU, where *the way*, you play is presented. You also get tools to intervene and set boundaries, and you get overview of what you can do, when the play does not work as you want it. The book is rounded off with a play catalogue, where you are presented both known and new plays with specific tools for, how the individual games can be played, so it gets the desired effect.

In the following chapter, you are presented the theoretical basis of NPU. You can view the theory as a bag with steppingstones that can form direction for the way that you will go in your work with NPU. Every steppingstone is connected to praxis examples, and the purpose is to give you opportunity to build bridge to your existing praxis. Along the way you can reflect on, how these steppingstones fit your existing fundament, where you can supplement your existing knowledge, and whether there are places, where it would make sense to exchange an old steppingstone with a new one. Regardless of whether the theoretical fundament of NPU is far from or close to your existing theoretical standpoint, there is the opportunity to attach NPU on various levels in your daily praxis in the day-care. And you can choose to place some stones in extension to your own or take the whole bag of stepping stones to a further development of your existing pedagogical work.

## Chapter 1

### Introduction to Neuropsychological Development play (NPU)



In recent years, a strengthened focus has come on the child's neuropsychological development in day-care. Neuropsychological development is about the child's development of sensory, emotional, and cognitive competencies with basis in newer brain research. The brain is a complex size and often it can be difficult to build bridge through brain theory and the daily pedagogical praxis.

If it is the first time that you immerse yourself in brain theory, it is common, if you should use some time to get used to some of the concepts and create yourself a good overview. All concepts is explained along the way, and in addition there will continuously be examples and cases in the book that has purpose to form steppingstones between the brain theory and your daily praxis. In the following section, you get insight into the theoretical fundament of NPU.

## Neuropsychological relational pedagogy

In NPU, we take basis in a neuropsychological relational pedagogy, which collects perspectives from recognized researchers, psychologists, and psychiatrists, who in different ways contribute to knowledge on the neuropsychological development of the child. These include Johan Bowlby, Mary Ainsworth, Peter Levine, Colwyn Trevarthen, Ale Duarte, Allen Schore, Daniel Stern, Arianne Struik, Bruce Perry, and Peter Fonagy, who all in different ways contribute to an adequate understanding of the child's development. Common to them is that they work from attachment or trauma-based framework of understanding, and overall, they are based in four basic understandings around development of the brain, which is presented in the following:

1) *The brain is overall hierarchical structured in a sensing, a feeling and a cognitive level, also called the triangular brain.*

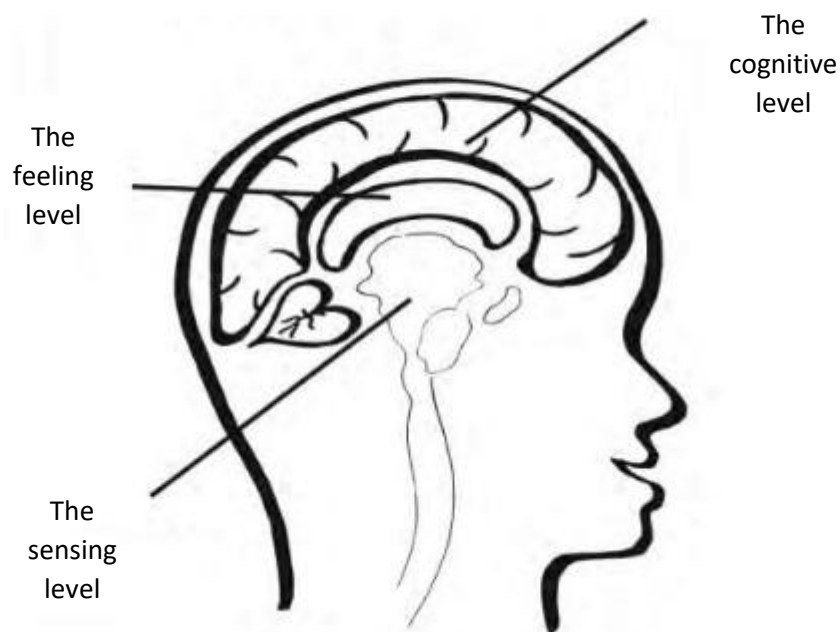


Figure 1: Structure of the brain with sensing, feeling and cognitive level.

Total development processes of the brain are integrated in complex neural systems across the sensing, feeling and cognitive level. These are developed through countless interaction processes, where the interaction between heritage and environment creates the prerequisites for the child's total development.

The division of the triune brain is thus a simplification of the total functions and complexity of the brain, but it is helpful, when we must form overview of the different neuropsychological processes, which affects play development of the child.

2) *The brain is basically developed from bottom to top*, which means that you through developing processes on the sensing level create fundament for development on the feeling level, which in turn creates a starting point of cognitive development processes. It is a bit like building a house. The fundament is not intact, it will affect the quality of the house that is built on it. There are for example parts of the sensing development, which due to different causes do not fit well enough, this affects processes in the higher development of empathy, impulse control or ability to put oneself in the place of others (Schore, 2003; Trevarthen, 2001).

3) The brain is developed in a relational context, which means that the quality of the relations, the child is part of creating starting point for the stimulation and development, which takes place in the child. Thus, the environment plays a big role, when you look at, what creates fundament of the child's development conditions (Fonagy, 2006; Panksepp & Trevarthen, 2009; Schore, 2003). If a mother suffers from a postpartum depression, it affects her opportunities to be included in developing contact to the child. Although her intentions are good, and she experiences love for the child, her depression will inhibit the emotional contact that can be between her and the child. It can also be a pedagogue, who have difficulty with the child crying and react with being uneasy in the body and does everything to distract the child and get the crying stopped. Although the pedagogue is happy for their job and have positive feelings for the child, the emotional state of the pedagogue will affect development opportunities of the child in these situations.

4) Senses and feelings are cognitive leading. This means it is stimuli of the senses and the feelings that precede the cognitive reflections. When we remember an experience, there is memory on both the sensing, feeling and cognitive level, and the memory that is on the sensing and feeling levels, which affect the cognitive memory. It can be a child, who sometimes has had difficulty at meeting. Therefore, it has aroused discomfort in the child when he/she has participated in the meeting. When the pedagogue calls for meeting the day after, the child's body will automatically reactivate the discomfort, because the body remembers how it was last. This activation of the discomfort can also happen if they just talk about gathering. The bodily and emotional memory thus affects the thoughts that we can think about experiences, we have had. If the discomfort is small, the child can often regulate it, but the discomfort is big, the adults must change the offer to the child and through this give the child opportunity to get new experiences with gathering (Bauer, 2006; Schore, 2003).

Now where you get the first steppingstones that form starting point for the theoretical fundament, it can be that some reflections have occurred in you. Maybe you could recognise some

from the examples, you have been presented, or maybe the four main understandings of the brain support or challenge your existing knowledge.

In the following you get the next steppingstones to the total fundament for NPU, namely the basic learning and development understanding. The four main understandings about structure of the brain forms fundament for a learning and development understanding that is pervasive in NPU, regardless of you using it in some areas or generally in your pedagogical praxis.

## **Learning and development understanding**

Development conditions of the child are created in a complicated interaction between heritage and environment. To create overview of the complexity, you work in NPU with the following metaphor for the learning and development understanding that you take basis in:

Try to imagine that the brain is like a piece of land, and in the ground, there are different seeds.

These seeds represent different characteristics such as awareness, energy regulation, body sensation, empathy, impulse control and mentalisation. These seeds sprout and does not develop at natural maturation but fertilised though positive interaction and contact with an adult, where eye contact is achieved. It is thus the quality of this contact that forms fundament of, whether the seed start to sprout and grow, or whether it withers and dies. You can say that the adults through the right interactions and contact habits fertilize and water the seeds of the child and thereby supporting development opportunities of the child. Thus, ability of the adults to read, tune and adjust in relation to the child, plays a crucial role on how the child develops.

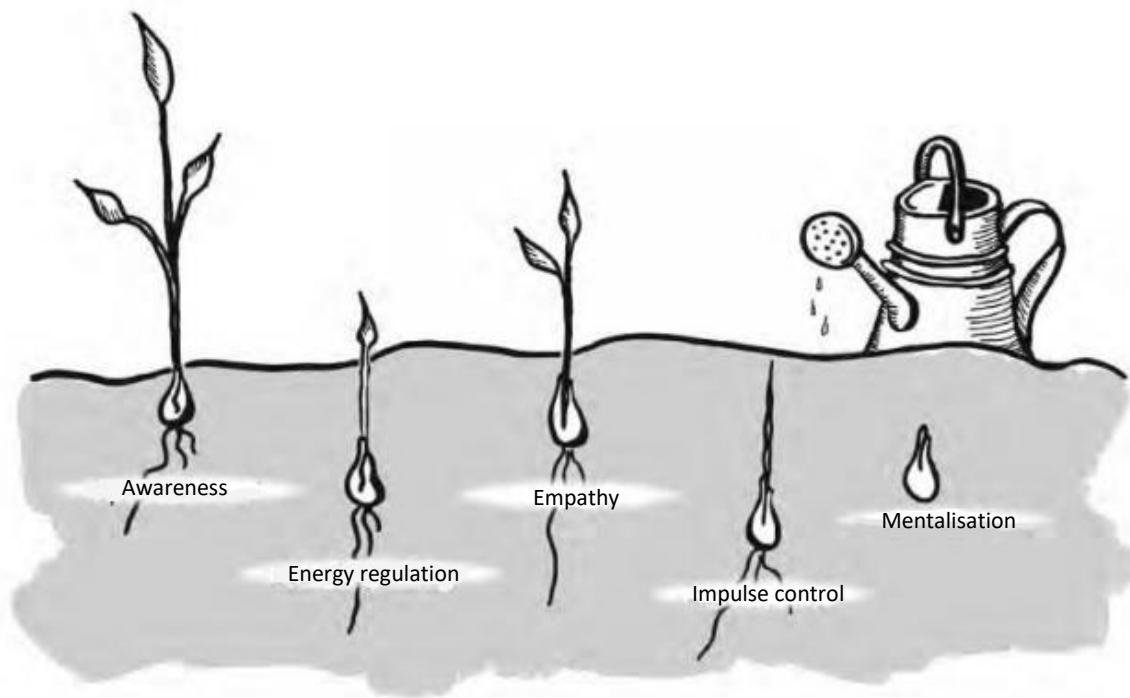


Figure 2: "Garden" of the brain.

At the same time placement of the seeds in the ground plays into development conditions of the child, since placement of the seeds is different from child to child. Genetically we are born with the same 'seeds', but since their placements in the soil layers are different, it gives different development conditions. The child, whose 'awareness seed' is placed in the soft mulch just under the soil surface, have good conditions to develop a well-functioning awareness, since this nervous system quickly will react and respond to the stimuli that is provided. It does not require much interaction and contact, not so much fertilizer and water before growth and development. The development conditions are difficult for the child, if awareness seeds lie deep down in the soil, maybe so deep that they are placed in the deepest clay layer under the soil. When you water a seed, which lies deep in the soil, the water can have difficulty of penetrating down to the seed, and longer time will pass before the nervous system reacts and responds on the stimuli that is provided. And even though the seed grows, its growth conditions will often be more difficult than the seed that lies in the soft mulch. Because this seed first sprouts long underground, longer time will pass before it grows up in the child's garden and becomes a competence that the child can benefit from.

## **Windows of opportunity**

When we look at development of the child, the brain research points at the fact that there are sometimes, where it is easier to develop selected skills and competencies than other times. These are called *windows of opportunity*. When windows of opportunity open, it means that nervous system of the child is ready to receive fertilizer and stimuli of chosen areas in the brain. If the child is in a healthy environment, where the caregivers to a reasonable degree can fulfil needs of the child and through interaction processes they fertilize current areas, these skills and competencies will develop naturally, without an extra effort being made. Many describe such processes as, 'it came all by itself, suddenly she just could'. When the window closes, no further development of the current areas happen, unless a special effort is established. Thus, we should not walk and wait that a child becomes better to keep the awareness, when the child is from 0-3 months, and thus it will later in life require a special effort to fertilize and develop the child's awareness, if the seed is not fertilized sufficiently from 0-3 months. This you call to 'open a backdoor', where there through interaction and play is focus on fertilizing the parts of the development, which has not followed the natural development line (Hart & Bentzen, 2013).

In NPU, they form open windows and the child's natural development line basis for the efforts that are made, and the following chapters give a comprehensive overview of, which skills and competencies that is best developed when, and likewise how you through play can open a backdoor to give extra fertilizer, where the child does not follow an age-appropriate development line.

Now you have gotten insight into the fundamental learning and development understanding and knowledge on development conditions of the brain, which is the starting point in NPU.

The next steppingstone is about the pervasive conditions that can both support and develop, but also affect and inhibit that development of the child follows the open windows and the natural development line. Here in NPU you work based on two conditions, namely significance of trauma and attachment on participation opportunities of the child. This you get a closer insight into in the following two sections.

## **Significance of trauma on participation opportunities of the child**

Though every age people have been traumatized by violent and life-threatening experiences.

Traumas affect the nervous system on both the sensing, feeling and cognitive level, where the fundamental interaction competencies and the capacity for self-regulation are inhibited.

In the neuropsychological relational pedagogy, you perceive traumas as locked reactions and conditions in the nervous system that are activated by one or several experiences. So it is not the experience itself that is the trauma, but the condition that the nervous system is left in immediately after the experience, but maybe it is only the one, who subsequently experience a trauma reaction (Levine & Kline, 2007; Struik, 2019).

This we see in the following case:

Imagine two girls who play in grandma's back garden. They go down to the back of the garden, where there is a fishing pond. The girls slip and fall into the pond. They both react with crying and despair, while they try in vain to try to get up. Luckily, they can reach the bottom, but the bottom is so sticky that they cannot get free by themselves, and some time passes before anyone hears them. When they both get up, they both get care and comfort by their parents. One of the girls gets through the incident, and there are no signs in her behaviour of a traumatization. Her behaviour is subsequently unchanged.

The other girl reacts immediately as if, she is okay, and she does not say that she is not afraid anymore. But in the weeks afterwards she changes behaviour. The girl goes from being able to play by herself in her room to preferably wanting to be, where the parents are, and she does not want to go into tub, which she used to love. Grandma's garden is suddenly boring to play in, so there is no reason to visit her. In the kindergarten the girl starts to change play behaviour. Before she used to be around the playground, playing in holes and experimenting with sticks, mud, and water. But, after the incident she would be, where adults are, and are very aware of, what they must do, and who are included. And she does not want to wash hands. She gets easier to tears, and generally she shows less curiosity and gait than previously. Luckily the girl is surrounded by caregivers, who are aware of her behaviour change, and she gets the right help to get worked on her trauma.

As this case shows us, strains and trauma reactions in the nervous system can develop from reactions in concrete situations to a more general anxious or stressed condition, which affects the general well-being. It can be difficult to say, what made the difference for the two girls in grandma's back garden. Maybe the girl, who had suffered a trauma, less overview, less excess or less control, since the incident happened. Maybe she managed to believe, they were going to drown. Or maybe her parents reacted with severe anxiety. That anxiety came to characterize the parents, while they comforted, so although their words were caring, the parents became anxiety in body and feelings, which affected the girl's nervous system and increased the burden rather than remedy.

Traumas in the nervous system are activated, when incidents overwhelm and paralyse us, and we experience that we do not to a sufficient degree have opportunity to defend ourselves with the

existing act strategies that we master. The younger you are and the more helpless you perceive yourself, the bigger the strain on the nervous system.

A trauma strain creates a powerful overproduction of stress hormones in the body, and if these stress hormones are not redeemed, then they set themselves as a lasting burden in the lowest part of the nervous system, where energy system of the body is developed and regulated. This part of the nervous system is on brain language called 'the autonomous nervous system', which is closer described in the section *Energy regulation* (page 56). At the same time, monitoring system of the brain is overactivated, which in brain language is called 'amygdala', which scans the surroundings for danger. This will help to maintain the body in a stressful condition, which inhibits seeds of the brain of sprouting. The monitor system of development and function of amygdala, you can read more in the section *From sensations to basic emotions* (page 73).

You can say that a trauma settles as stone or gravel in the child's garden. It inhibits the seed in sprouting the 'straight' way up and become a flower in the child's garden. To avoid several trauma reactions and thereby several stones and more gravel penetrate the ground, the child develops self-protective conditions, which lie as ice on the child's garden. The ice has the purpose to help the child with avoiding situations that can reactivate the trauma reaction in the nervous system. This inhibits the child to flexibly use skills and competencies that have grown in the garden, and at the same time it inhibits our opportunity to water the seeds that await sprouting (Levine & Kline; Struik, 2019).

In NPU, you work based on the fact that all children (and adults) in different ways are trauma carriers, since it is both small and big incidents which can activate trauma reactions in the nervous system. At some point, all people have in their life been exposed to situations, which will give strains and trauma reaction in the nervous system. It could be that you have laid too long and cried, since you were infant. It can be a fall on a bicycle, or it can be a car that backed into your car at the parking lot at the local supermarket. Too early birth, adoption, hospitalizations, divorces, death, and similar situations, which are accidental part of many families, also seen as experiences that can create trauma reactions in the nervous system. However, it can also be more visibly serious incidents such as assault, violence, and care neglect.

If it is gravel, i.e. smaller trauma reactions that have settled in the ground do not inhibit the child's development in the long term, if we get the ice thawed and supported that the child release their self-protective conditions and instead develops healthy self-regulating strategies. But bigger stones in the soil can for some have come to stay. Thus, seeds that lay under the rock in the soil must find new ways to grow and will maybe never be able to sprout with exactly the same force, as before the stone, i.e. the trauma, hit.

When a trauma settles in the nervous system, it means something for how the seeds in the soil are fertilized beforehand. A child with a fertilized soil and seeds, which sprout and grow will have an easier time recovering a healthy development line than a child, whose soil from the outset is not watered and fertilized sufficiently. There is likewise difference, if it is a simple incident that creates a congestion of the nervous system, or whether the child is born into an environment, which generally burdens the child's nervous system. If the environment is generally not developing for the child, it can develop what you call attachment traumas. Thus, the primary capacity of caregivers to create a safe environment, where the child through a myriad of small interactions

gets their seeds watered, a big role, when we must form an overall understanding for the child's development conditions (Levine & Kline, 2007; Struik, 2019).

In the following section you get insight into, how attachment is developed, and how both safe and insecure attachment affects participation opportunities of the child.

## **The importance of the child's participation opportunities**

Through a myriad of interaction situations with the primary caregivers, the child develops interaction habits that form the fundament for participation of the child in contact, play and interaction. These interaction habits are called attachment patterns. Attachment patterns are interaction patterns that have become automated, and they become preferred interaction form of the child. The vast majority attachment patterns create predictability, and the child thus develops an expectation of, how the caregivers react, which makes it possible for the child to adapt to the reactions. This creates safety and predictability, even though the interaction pattern is not developing for the child. Thus, a child always seeks to maintain the interaction patterns, it shares with your caregivers. Also, even though they are not developing for the child (Bowlby, 1996; Broberg, Granquist, Ivarson, & Mothander, 2008).

Basically, the child can be secure or insecure in their attachment. If you become secure in your attachment have been sufficiently experienced your primary caregivers as a secure base, where you can get care, comfort and covered your basic needs. At the same time, the child has gotten support to search out and examine world, and the caregivers have likewise take care of the needs of the child for care and comfort, when the child has sought back to the secure base.

The insecure child expresses their insecurity in different ways. Some become anxious in the attachment, some become ambivalent, and again others either become elusive or disoriented in their participation in contact, play and interaction. When you are insecure in the attachment, the caregivers have not sufficiently managed to create a good balance between establishing a secure base for the child and at the same time support the child's curiosity out into the world. It is both behaviour of the parents and their inner conditions, which affect attachment of the child, and an insecure condition is dominated by self-protective conditions that inhibit the child's development and participation in play and interaction. In insecure attachment conditions, you can talk about bigger or smaller attachment traumas, thus lasting burdens of the child's nervous system that inhibits healthy development of the child.

Imagine a high-rise building, where several families live. On the ground-level there lives a mother, who is secure in the attachment to her child. When the child awakes at night, the mother takes up the child, walks silently around, cradles her/him a bit and says simple soothing words. However, it is not the mother's actions that establish the security, so the child can regain calmness. It is nervous system of the mother. In her body there is calmness, and in her feelings, there is love and satisfaction of being allowed to help the child. It is these inner conditions that makes the mother's actions have the right effect.

On the other floors in the house, there are throughout the night several mothers, who have children, who are awake. If you saw a videoclip, you could on all floor possibly see actions from the other mothers, which resembled the behaviour that the secure mother had at the ground level. But depending on the style of attachment, inner conditions of the mothers will be expressed



through either anxious, ambivalent, avoiding or disorganised expression. Common for these is that they have root in a basic discomfort in the nervous system and is linked to self-protective conditions that block the love and rest that the mothers will give their children, reaches into the child's nervous system (Bowlby, 1996; Broberg et al., 2008; Fonagy, Schore, & Stern, 2007).

## **Tuning, mis-tuning and re-tuning**

In the work with NPU, you have consistent focus on the fact that interaction patterns are developed through three basic conditions in the interaction between the child and the primary caregivers. These are called *tuning*, *mis-tuning* and *re-tuning*.

In the *tuned condition* there is common energy level, common emotional mood and common needs and goals for their togetherness. Here variations in interaction is developed and refined, and there is exchanged feelings in a reconciled relationship between the child and the caregiver. In all relationships, there may occur a *mistuning*. A mistuning can occur on one or several prelinguistic levels in the interaction between the child and their caregiver. It can be on energy level, where the child maybe run up in energy, while adults are down-regulating, or it can be on the emotional level, where the child wants more contact, but the caregiver withdraws for example to answer another child, to look for their phone or to go to the toilet. Mistuned contact arouses discomfort and activates monitor system amygdala of the brain, which scans danger in the situation. Luckily, adults can *re-tune* the contact with the child by relating to the child's inner conditions, and through positive emotional tuning and regulating interaction behaviour they make it possible to resume the synchronised and tuned contact in the interaction. During the day, a myriad of mistuning happens between child and caregiver. Mistunings that are quickly re-tuned are not dangerous, but on the contrary a central part of child's development. However, the child cannot tolerate being left behind in a mistuning, since it overactivated monitor system amygdala of the brain and the autonomy nervous system, which controls energy regulation of the body. The child will through self-protective conditions try to come out of the discomfort, which is linked with being in mistuned contact. It is ability of the caregivers to be part of tuned contact and their ability to quickly re-tune contact, which forms attachment pattern base of the child. The child always chooses the attachment pattern and thereby the interaction habits that evoke the most pleasantness and tranquillity in the caregiver. Even if it means that the child is in a self-protecting condition in the contact with adults (Bowlby, 1996; Schore, 2003).

The children in the current child group all have interaction habits that are developed in the early attachment to their primary caregivers. These patterns have the primary purpose that the child can adapt to needs and habits of the caregivers. Sometimes at the expense of the child's own boundaries and needs. Everything with the purpose to belong and getting love and security. Likewise, the children in the child group also decode our nervous system and our habits for interaction. They also adjust our habits and patterns in the relation to the wish of belonging, while they are in the day-care. Research point at the fact that it is only around 50 percent of the Nordic children in day-care, who have gotten a secure attachment to the professionals in their daycare (Ahnert, Pinquart, & Lamb, 2006).

That is why you work consistently with focus on own nervous system in NPU to ensure that the nervous system that the child must lean on supports and fertilizes the safe attachment strategies of the child. Focus on your role in NPU is elaborated further in chapter 7 (page 107), where you also get tools to work consciously with your own nervous system and your interaction habits.

## **A common starting point**

Because play and playful interaction on many points are built up in the same way as the interaction that unfolds in the early safe attachment relation, it is in NPU possible to fertilize the safe attachment relation, it is in NPU possible to fertilize the safe attachment and support healing of traumas.

To ensure that our approach to the play supports these processes, you work in NPU with four principles contributing to the fact the play gets the right effect in nervous system of the child. The goal with the principles is to support that the play gets the intended effect, both in children in well-being and in children, who from different reasons different reasons need extra help and support. The four principles are that we work *experience-oriented*, we work 'bottom up', we work with basis in the *closest development zone* and with starting point in *development age* of the child. In the following you get opportunity to dive down into the principles and get insight into, how they support the child's participation in play and playful interaction.

## **Experience-oriented**

The first principle for the work with NPU is that we work *experience oriented*. In an experience-oriented approach, we take based on knowledge that an experience is first registered and saved in sensory systems of the brain and emotional parts of the brain and then processed in the cognitive levels.

In the concrete praxis for the work with children will an experience-oriented approach be that you do what you want the children to do, rather than explain and articulate to them first. If for example you want that the children clap on the thighs, you just want to get started with doing it and at the same time be aware of inviting the children to do the same through their gesture, mimicry and attempt of positive eye contact. This approach awakens the innate imitation ability of the child and at the same time activates attention and curiosity of the child that are some of the very basic seeds, which must be watered to stimulate a healthy sensory, emotional and cognitive development. If you choose to articulate that 'now we should clap on the thighs', the child's cognitive functions are activated, which initiates another process in the child. Here you talk to the existing skills and asks the child to organise these to action.

## **Bottom up**

All interventions and efforts in the work with children can be categorised as 'bottom up' or 'top down-processes'. These concepts refer to, which parts of the child's brain that we primarily stimulate through the intervention, and thereby also which development opportunities that we support in the child. As described in chapter 2 (page 29) you work in the neuropsychological relational pedagogy based on the knowledge that the brain is developed from the bottom up.

Bottom up-processes fertilize and water the seeds, then the child has opportunity to develop new skills and competencies, while top down-processes give the child opportunity to use existing competencies in a given context.

It is common that everyday praxis both consists of top down and bottom-up processes, and it is not about an either or but a both of. However, you should be aware of the differences, it can do in the group of children, whether one is basically working bottom up or top down. In the following cases, you get examples on, how an overall top down-approach and a bottom up-approach can affect participation opportunities of the children:

## **Top down**

The child group must hold assembly, and there is a pedagogue and two assistants who participate. A pedagogue should lead the assembly, and she has a suitcase with pea bags and scarves. The children have pillow that they sit on and get into the living room from the common room and the toilet. The pedagogue sits in the circle and assign the children, who cannot by themselves find their seat. There are three-four children, who begin messing with things on the bookshelf instead of sitting down. The pedagogue says with a friendly voice: 'hallo, come here and sit down, the assembly starts now.' The children look at the pedagogue and nod. The pedagogue moves their attention to those, who sit in the circle. A couple of girls sit and start to sing the start song and poke a bit to each other. 'Girls, you just have to wait with the song until everyone is ready,' the pedagogue directs, after which her attention is again caught by the children at the bookshelf. They are still standing there. Irritation level of the pedagogue rises a bit, and she experiences that her overview is weakened. 'Come here and sit down' she says with a loud voice and subsequently smile to get them involved. 'Or you cannot attend the gathering'. 'I do not like assembly,' one boy says, and the others nod. 'You must be involved,' the pedagogue says, 'come on, it is going to be fun'. Meanwhile the rest of the children and two assistants have sat down. There is a bit of unrest in the group, and the assistants begin to instruct the children to find peace. The pedagogue asks one assistant about getting the children at the bookshelf, and they go reluctantly and find their seats. 'Well,' the pedagogue says and looks around on all the children, 'there just needs to be calmness before we can start. See, whether you can find calmness.' Several children become silent, but three-four children sit restlessly and small talk. The pedagogue can feel the irritation increase, and she says with firm voice: 'Then this is the last chance, I want, you are silent now. We cannot start, before everyone is silent.' The children look a little startled at her and become silent. The assembly can start. The pedagogue explains the games, they must make, and what they need after assembly. Then the first game starts.

The same situation would look different with a bottom up-approach:

## **Bottom up**

As above the children come from the common room and the toilet. The pedagogue sits in the circle and gives a high five the children, who come in and direct them to their seat. There are three-four children, who start messing with things on a bookshelf instead of sitting down. The pedagogue says with a friendly voice: 'hallo, come over here and get a high-five.' The children look at the pedagogue and nod. The pedagogue moves their attention to those, who sit in the circle. A couple of girls sit and start to sing the start song and poke a bit to each other. The pedagogue hums along and says to the girls: 'Nice, you can remember the song. Save it for a moment, we start shortly,' after which her attention is again caught by the children at the bookshelf. They are still standing there.

The pedagogue direct that one of the assistants just help them over to her in the circle. The children come over to her. They all get a high five and a big smile from the pedagogue, who clearly shows with their body that she cares for the children. Then, the pedagogue sings repeatedly 'come, come, sit down – almost like a rubber goat.' Several children laugh and sing along. Meanwhile, the other children and two assistants have sat down. There is some unrest in the group, but song of the pedagogue has a regulatory effect, and while she slowly turns down the volume of her voice, unrest of the group is regulated. A boy from the circle pulls away and reaching out for some toys. The pedagogue smiles friendly to one of the assistants, who silently put a hand on the shoulder of the boy, whispers something to him, and together they return to the circle, where the boy sits on the lap of the assistant with a car in hand. Meanwhile the song from the pedagogue is now so weak that it can hardly be heard. The pedagogue takes a yoga bell and rings with it. All the children listen attentively. They know they must mark when they cannot hear the clock any longer. Since all children have marked, the pedagogue begins to clap alternately on thighs and hands. The start song begins. Assembly is underway.

The difference on the two cases can be seen on two levels. In first case the language is primarily the focal point for the contact between the children, the pedagogue, and the assistants. The guiding that is going on is linguistically grounded, which can be effective, when the child masters the requirements that are made and at the same time has overview of the situation. However, the children, who do not have the overview, or who do not quite master requirements that are made are challenged, and the language do not here have a regulating effect. As the pedagogue sticks to the linguistic approach as primary intervention form, she must turn up the volume and the firmness in the voice to calm down. In the other case body language, touch, and rhythm fundament of the contact. Even if the language is used. This is regulating for lower parts of the brain, where attention of the child and energy regulation is founded. Because the contact form talks to this part of the brain, it works more regulatory for the child group and at the same time activates their capacity for self-regulation. Likewise, the language is not used in the transitions. The pedagogue uses dynamic in their song and the clock to mark that now something new happens, and she begins the start song by clapping on the thighs instead of telling that 'now we sing the start song'.

Additionally, the internal conditions of the pedagogues are different. In the first case, the pedagogue is challenged on their overview, which arouses irritation. In another case, the pedagogue manages to remain calm and thereby the opportunity to be able to establish a full contact and regulating room for the children.

In NPU you always work with bottom up-processes as thorough approach to the work with play and playful interaction. Here you get inspiration from the American children psychiatrist Bruce D. Perry, who presents basic principles: First we regulate ourselves in the contact with the child. This often happens through body contact and, where we become a regulating instance for the child. Hereafter we relate to the child and reconcile emotionally in the contact. And then we *reflect* and *resonate* with the child, then have a little dialogue or give an instruction (Perry, 2017). As a simplified principle, you can work with: *Always remember to establish contact, before making a demand.*

A bottom up-approach fertilizes the self-regulation, regardless of which level the child is on their development and supports small development processes that have a healing and developing effect on the self-regulating levels in the brain.

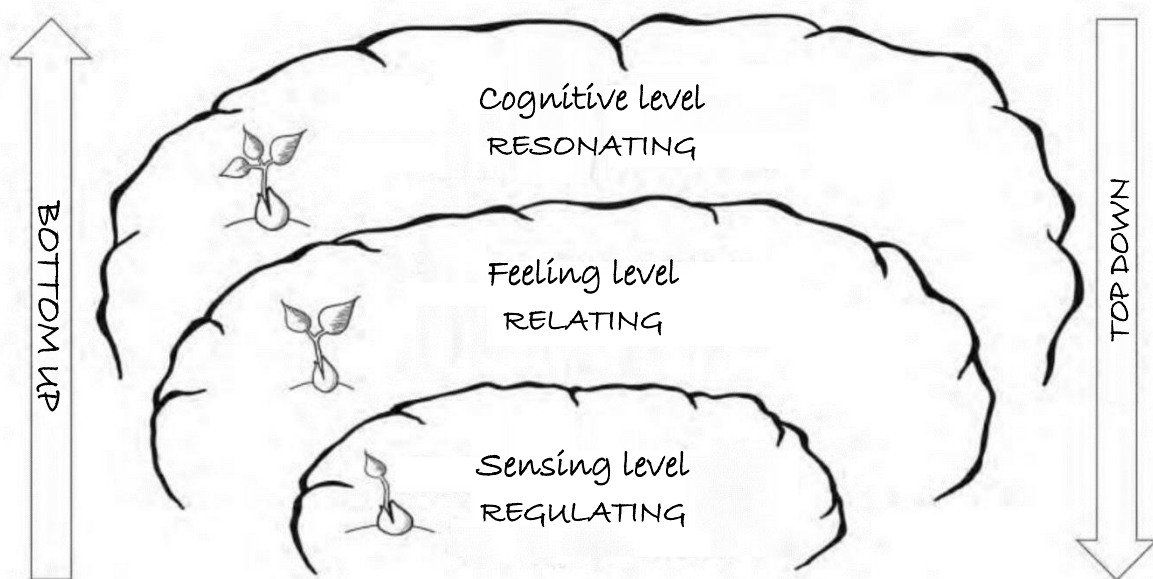


Figure 3: Bottom up and top down. Model with inspiration from Bruce Perry.

At top down-processes, the language is the focus point, and you invite to reflection and reasoning or give a simple instruction of the child that he/she should follow as for example, 'come and sit on your butt'. This approach is good, if the child is within the nearest development zone, which is the third principle working from the NPU. A rule of thumb can be: Linguistic instructions are effective if they work the first or second time. You do not get the reaction that you want, you need to switch from top down (linguistic instruction) and to *bottom up* (contact before demand). This give the child the best development opportunities, and you ensure that you support the child within the nearest development zone.

## **Nearest development zone**

In the work with fertilizing and water the child's seed and support its development, it is crucial that the interventions and efforts that we initiate, affects the child's nearest developmental zone. The theory of the nearest development zone is described by Lev S. Vygotsky that defines three phases, the child can be in the learning process; 'cannot', 'can with help' and 'can do it'. 'Can with help' is the closest development zone and is the point, where the child can participate and master with help and support from an adult. In the interaction in the closest development zone, many small interactions and small appropriate disturbances are created, which together help to create the right tension field between safety and development (Smidt, 2011).

With inspiration in the theory about closest development zone, in NPU there is worked with an expanded model, which contains four levels or phases:

*Cannot yet*, where the child neither can by themselves or with active support and help has the capacity to master the requirements and skills that are in the context. It can be a small child, who not yet can maintain their weight on their own legs and can thus not walk, Here, walking training will be 'cannot yet'.

*Can with help*, where the child is dependent of the fact that we help and support them in participation and mastering in the given context. This is the closest development zone. It can be a child, who hands out packed lunches to the group. The child masters the motor part, but needs support to create overview of, which packed lunches that belong to which child, and where the child sits. The child masters with help from the adult.

*Can almost certainly*, where the child is so well on their way to develop the capacity, which is required to be able to participate and master in the given context that it in its own makes its experiences and only a few times need support. The child repeats the skills that are developed through interactions in the closest development skills on their own. As the skills are not yet automated, the child will need calm to repeat the skills in known contexts. It can be the child, who have just learned to put on snowsuit. The motor skills are in place, but it is clear to see on the child's face that it is really working on keeping concentration. The child cannot yet enter into dialogue or show flexibility in mastering the action but is in progress with automating this. So even if the child can put on the snowsuit, the skill is not yet so sure that the child is ready to several new requirements in same situation.

*Can certainly* where the child through a myriad of interactions and small interventions in closest development zone and subsequent repetitions on their own have developed a capacity within the given skills and competence areas that make the child independent and flexibly mastering these. It

can for example be the child in the wardrobe, who have gotten automated the process with putting on snowsuit, and at same time can make agreements with their friends about, what they should play, while taking snowsuit on. When the child masters overview of both the motor action and the dialogue with the comrades, it is about 'can for sure'.

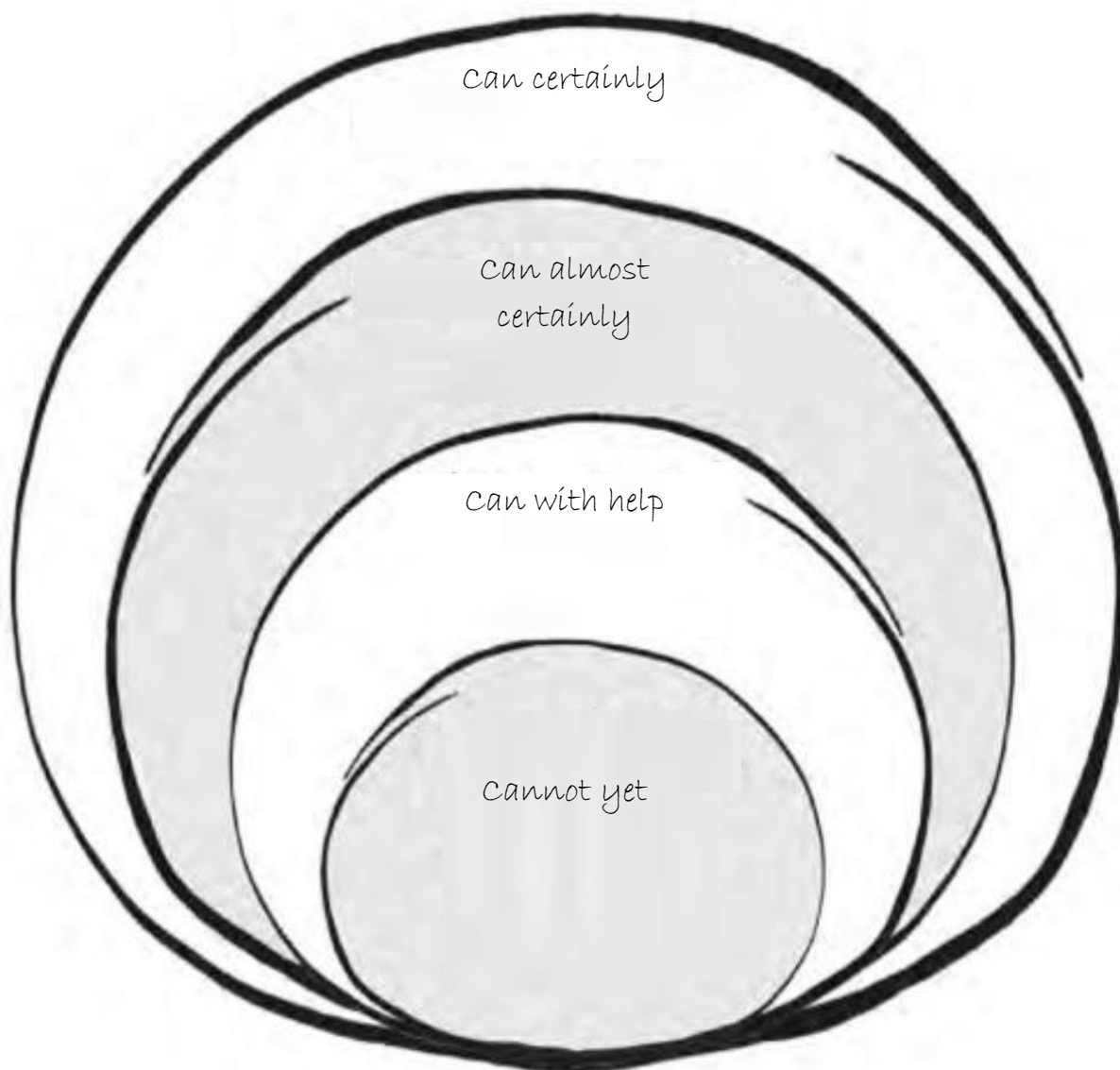


Figure 4: Four levels in the child's closest development zone.

Where Vygotsky in their description of the theory of closest development zone uses the concept 'can self' that you use in the neuropsychological relational neuro-psychological pedagogy 'can certainly'. Most of the competencies and skills, which is worked with in NPU is about something, you 'can' together with each other, for example to make eye-contact and smile to the other person. Here the child is dependent on the fact that there is another person, who will 'be with'. Thus, it is something that the child 'can themselves', but something the child 'can certainly'.

## Development age

When we work in the closest development zone, we have an overview of, where the individual child is in their development. In NPU there is distinguished between the *biological age* that is the child's actual age, and its *development age* that indicates, where the child is in their development within selected areas. For example, a 6-year old child can be 3 months in their development age within attention and an 8-year old child can be 6-9 months within their ability to reconcile emotionally with others. In the following chapters there is provided overview of the development age for among other things attention, body sensation, energy regulation, empathy, impulse control and care, and there are given tools to adjust different plays for the current area that you wish to stimulate.

Now you have gotten insight into the basic principles and thereby the basic stepping stones that you lay as fundament for the work with NPU. Maybe you could recognise something from your own praxis, maybe you got new ideas or considerations in relation to the way, you used to work. Common for the principles are that they support the natural processes that happen in the brain, which meaning the play can get for the child's development and overview of the different levels, on which the child can enter into play and playful interaction.



Neuro-psychological Development play focuses on the child's development through play as an integrated part of pedagogical praxis.

All children benefit from Neuro-psychological Development play, and especially the children who do not develop age-appropriately get new development opportunities, when they meet caring adults, who can support their development through play, contact and interaction.

Based on recent brain research, the book gives you overview of the child's development on the sensing, feeling and cognitive level, and you get tools to examine, where the child is in their development on the different areas. On this basis, the book puts focus on, how you best strengthen the child's prerequisites to develop age-appropriate play and interaction skills.

Through the huge play catalogue of the book and many examples from praxis, you as pedagogical professional get concrete inspiration to work with play and playful interaction. Both for benefit of the individual child's development, for the children community and for the interrelationships between the children.

At the same time, you support development of the children, you get wiser through the book on your own role in the interaction, and how your nervous system also come into play on your relationships with children and colleagues. It is thus not about the play, but the way we play on.

The book refers to you as pedagogical professional, consultant or leader at the day care area.



The book is written by Tea Thyrré Sørensen, who is independent pedagogical psychological consultant and supervisor, music pedagogue and trained within different neuro-psychological approaches and methods for the work with development of children through play and playful interaction.

Learning environments of high quality makes a difference for well-being, learning, development and forming of the children. The series "Learning environments in day-care" puts spotlight on, how the pedagogical staff can organise strong learning environments that accommodate both the child and the children community, as well as play and learning. The goal is to create good conditions for the child's development and thereby strengthen and lay the groundwork for their curiosity and joy of learning.

Target-group of the series is staff and leaders in day care institutions, but also students and educators at the pedagogy education, as well as day-care workers and pedagogical consultations can enjoy reading.

In the series is among other things published in *From intention to praxis* – meaningful goals for learning environments in day care by Søren Smidt and Suzanne Krogh and *Systematic reflection in pedagogical praxis – new opportunities for action and better well-being* of Søren Fisker.