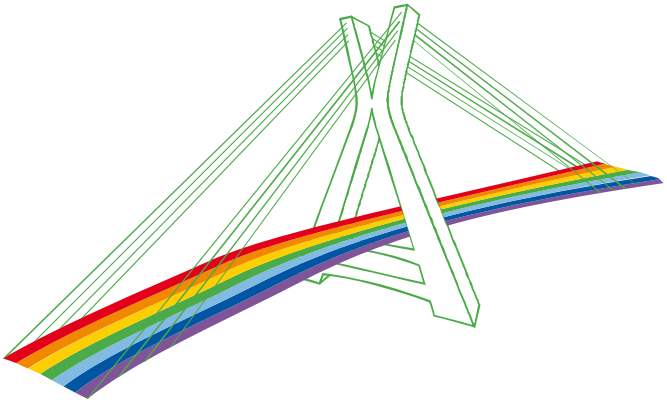

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Sessão Especial

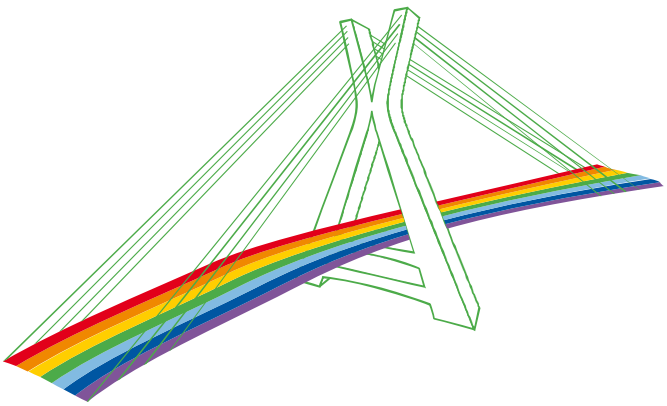
Special Session

Sesión Especial

Novas perspectivas no cérebro límbico humano e como isso pode mudar a abordagem educacional de pessoas com surdocegueira

Jan van Dijk (professor Dr.emeritus) holanda

Tradicionalmente a educação de crianças com surdocegueira é focado no desenvolvimento de interação e comunicação. Muitas vezes, estes objetivos são prosseguidos através da aplicação de técnicas para melhorar o uso de pistas de objetos, fotos e símbolos mais formais como sinalização tátil. Em todo o mundo os resultados dessas tentativas são decepcionantes. Tanto a linguagem receptiva e expressiva não se elevam acima do nível muito concreto do "aqui e agora". Mais ainda, um grupo significativo dessas pessoas apresentam comportamentos indesejáveis, por exemplo, auto agressão, isolamento extremo e estresse. Depois de meio século trabalhando neste campo, tanto como praticante e como cientista, eu ainda estou procurando novas maneiras de melhorar a qualidade de vida para essas pessoas. Estes podem ser encontrados no campo da neurobiologia. Há evidências convincentes de que as raízes de interação sincrônica entre um adulto e uma pessoa com surdocegueira pode ser encontrado no papel de neurônios-espelho. Este sistema também explica a base da empatia entre as pessoas. Tem sido demonstrado que o papel da amígdala em pessoas com cegueira, em relação ao comportamento de "aproximação" e "afastamento" (medo) difere significativamente do comportamento de pessoas que enxergam. Há também evidências de que o sistema de regulação do estresse difere em pessoas com deficiência múltipla sensorial das pessoas sem deficiência sensorial. Estes processos são representados no " cérebro velho" humano, que lida principalmente com as emoções. Nestas áreas límbicas do nosso cérebro a fundação é estabelecida para uma vida emocional saudável. O cérebro límbico é entrelaçada com áreas corticais, em especial daqueles de atenção e motivação e para a comunicação com os outros. Métodos tradicionalmente educacionais (currículos) estão centradas na estimulação desses aspectos da aprendizagem, sem considerar o papel essencial do sistema límbico. Na minha apresentação vou mostrar com clipes de vídeo como uma abordagem de baixo para cima (límbico), ao invés de uma abordagem (dominada pelo educador) de cima para baixo abre novas perspectivas na qualidade das vidas de pessoas com deficiência múltipla sensorial, incluindo surdocegueira.



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Sessão Especial

Special Session

Sesión Especial

New insights in the human limbic brain and how this may change the educational approach of persons with deafblindness.

Jan van Dijk (professor Dr.emeritus) The Netherlands

Traditionally the education of children with deafblindness is focussed on the development of interaction and communication. Often these objectives are pursued by applying techniques to enhance the use of object cues, pictures and more formal symbols such as (tactual) signing. Worldwide the results of these attempts are disappointing. Both receptive and expressive language do not rise above the very concrete level of "here and now" . Even more so a significant group of these persons exhibit undesirable behaviours e.g. self –abuse, extreme withdrawal and stress. After a ½ century working in this field both as a practitioner and as a scientist, I am still looking for new ways improve Quality of Life for these persons . These can be found in the field of neurobiology. There is convincing evidence that the roots of synchronic interaction between an adult and a person (with deafblindness) can be found in the role of mirror neurons . This system also explains the basis of empathy between people. It has been shown that the role of the Amygdala in persons with blindness, concerning the behaviour of "approach" and "withdrawal" (fear) differs significantly from normal sighted persons. There is also evidence that the stress regulating system differs in persons with (multiple) sensory impairment from persons without sensory impairment. All these processes are represented in the human "old brain", which mainly deals with emotions. In these so called limbic areas in our brain the foundation are laid for a healthy emotional life. The limbic brain is interwoven with cortical areas in particular of those for attention and motivation and for communication with others . Traditionally educational methods (curricula) are focused on the stimulation of these aspects of learning, without considering the essential role of the limbic system. In my presentation I will show with video clips how a bottom-up (limbic) approach , rather than an (educator dominated) top-down approach opens new perspectives in the (Quality of) lives of persons with multiple sensory impairment, including deafblindness.

XV Dbi Conference on Deafblindness
The role of the Emotional Brain in the Well Being of Persons with Deafblindness.

Dr Jan van Dijk
(prof. emeritus)

We will start with an experiment:

Watch this picture

Watch this picture

What did these experiences teach us?

The presented objects:

- the rose
- the velvet
- the sandpaper
- the cheese
- the pictures
- the marmalade

They all provided us with ***KNOWLEDGE*** and ***EMOTIONS***

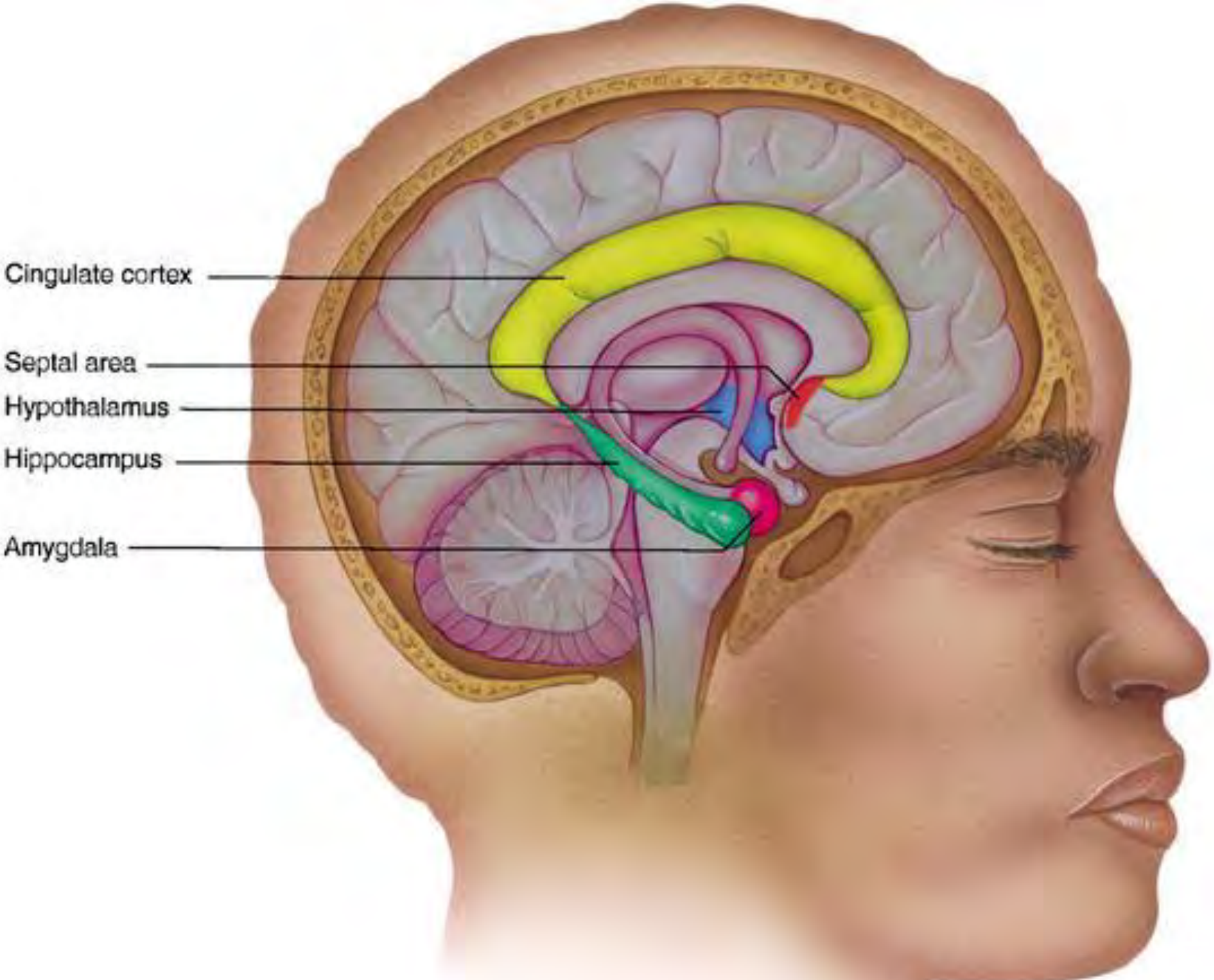
- It is clear that in perception, ***knowledge*** about the subject and ***memory of experiences*** play in important role for efficient processing of the information in the brain.
- In this perception process, adequate functioning of specific ***cortical*** areas in the brain is required.

- However, there is another dimension in perception.
- In looking at the “threatening” face, aversive *emotions* might have been triggered, and in looking at the angel you might have been “attracted” by the pretty face.
- You might have had aversive emotions when you saw .....sticking her finger in the jar of marmalade. You felt bad for this person.

- The same probably counts for smelling pleasant odors of the soap and the repelling odors of the cheese.
- Just by watching another person's emotions, your own emotional system is triggered. This is made possible by our

Mirror Neuron System.

- Brain studies have taught us that sensory stimuli not only carries information which is processed in the *cortical areas* of the brain, but is also associated with *emotions*.
- In processing these emotions a complicated structure in our brain plays an important role. This system is called the *Limbic System*


Cingulate cortex
Septal area
Hypothalamus
Hippocampus
Amygdala

http://www.youtube.com

Go to this site to watch 3D video clips of different parts of the brain

http://www.youtube.com/watch?v=BHfOui9hSg4&feature=related

<iframe title="YouTube video player" width="480" height="390" src="http://www.youtube.com/embed/BHfOui9hSg4" frameborder="0" allowfullscreen></iframe>

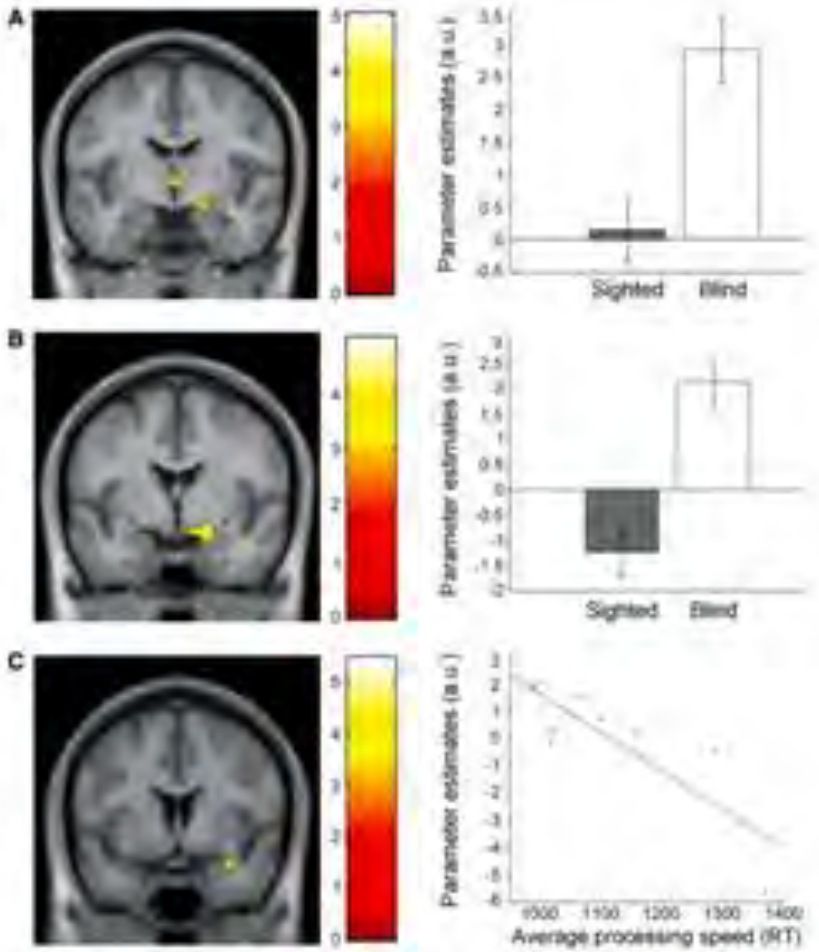
- The limbic system (Latin: limbus = arch) consists of structures in the brain which are involved in emotions, motivation, pleasure, and memory of emotions.
- In the evolution of mankind the limbic system developed quite early. It can be considered as belonging to the ”old” brain, but it also contains a few newer structures.

- Our conclusion so far is that the sensory input which enters our brain is strongly interwoven with emotions, in particular with feelings of “approach”, and of “withdrawal behavior”.

- This process plays an important role in the development of *attachment* behavior. The attachment person's touch, odor, facial expression, and intonation of the voice, leave their traces in important nuclei of the limbic system - in particular, in the amygdala and hippocampus (memory).

- A very interesting research finding concerning the Amygdala comes from Germany.
- Klinge et al. (2010) found an increased activation of the Amygdala in congenital blind persons when emotional auditory stimuli (e.g. angry spoken syllables) were presented.

BOLD responses in the amygdala.



Klinge C et al. Brain 2010;133:1729-1736

BRAIN A JOURNAL OF NEUROLOGY

- In the next video clip you can observe Landon. The child is very delayed in his development. He functions at such an elementary psychological level, that cognitively he is unable to distinguish the touch of his mother from those of the assessor (Dr. Jan van Dijk)
- Despite this you can observe that Landon opens his hand for his mother and pulls it away when the assessor touches it.

- Insert video clip of Landon.

- The “approach” and “withdrawal ” behavior of Landon can only be explained through the role of the Limbic System which “valuates” the sensory input according to the principle of “protection or safety” or “thread”.

- This sensitive mother was not aware how, through her behavior, she created a feeling of comfort and security for the child.
- These feelings are represented in the limbic structures, in particular the Amygdala and the Hippocampus, of the child.

- This can also be demonstrated in Matthew.
- In the first clip you can observe how he is attracted by the assessor's friendly approach.

- In the following clip you can observe what happens when the assessor touches Matthew's arm.

- It could be that Matthew's Amygdala has processed the assessor's touching as a thread. Every time that he observed the assessor approaching him it may have made the Amygdala send messages to the hypothalamus to produce the *stress hormone: cortisol*

- The Amygdala has many connections with the memory (hippocampus) and with other limbic and cortical structures. This could make a single traumatic experience generalize to many people and situations.

- Apparently Matthew's Limbic System has developed in such a way that the many positive emotional experiences "outweigh" the negative ones.
- This is not the case with Kiril

- Kiril is a Russian 9 year old boy with multiple sensory impairments. He was born prematurely and raised in a very unfavorable educational situation. In pure despair his foster father “dropped” him at a Children's Home for Deafblind children.
- The filming of the following clip took place 2 days after Kiril’s arrival at the Centre.

- Notice that he puts his arms in front of his face when people approach him.
- The Amygdala triggers a fear reaction which has been developed in the past.
- Insert dvd *"Let's talk Limbic"* video clip

  Kiril 1

There is reason to assume that:

- ***Stress*** was present during his mother's pregnancy and as a consequence of this his *brain growth* was arrested
- The *stress-regulation system* is unbalanced
- *Reduction of neurons* in the hippocampus (memory impairment)

Results of these unfavorable factors:

- Irritable and difficult to sooth baby.
- High levels of stress hormone (cortisol) in mother and child.
- Atypical diurnal cortisol levels.
- Hyper arousal which causes challenging behaviors.

Research on blind children and adolescents with severe multiple disabilities and challenging behaviors showed:

- Stress regulation system severely disorganized (Sterkenburg 2008)
- Attachment problems

STRESS can be described as:

*The feeling of the individual to be unable to **cope** with the situations of daily life. There exists a general feeling of not being in control and of helplessness.*

- In studies with blind and foster care children (Schuengel et al. 2010), it could be shown that unfavorable stress levels could be lowered when the therapist was able to establish *a secure bond* with the child, and took her time to get to know the child.
- Also games of “leaving and coming back” added to this.

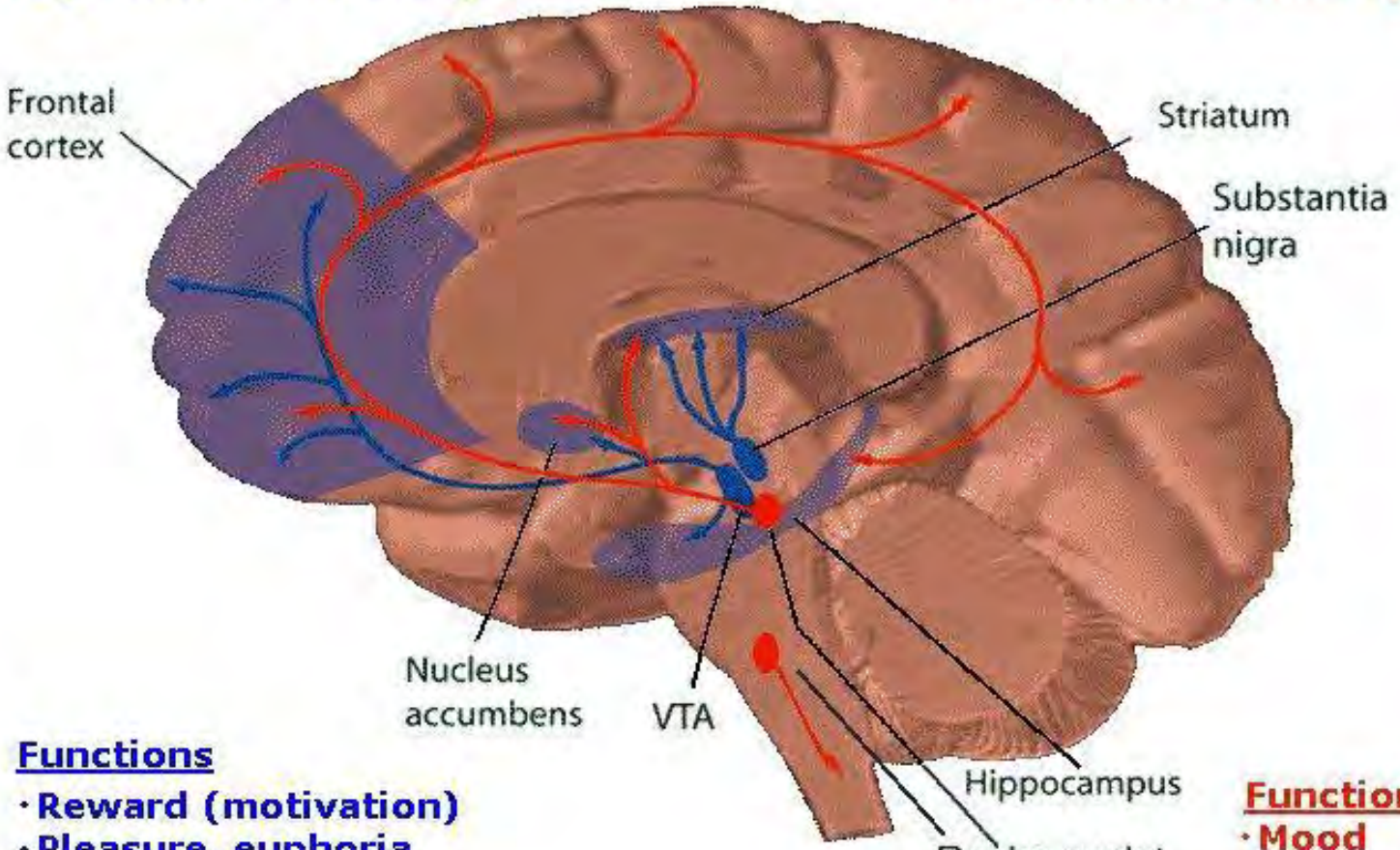
- Let's look at Landon again. You can observe that the mother *interprets his feelings* ("you are a happy boy"), and *resonates* with his voice ("ahhaaaa"), and *follows* his arm movements.

- In the process of interaction, the *mirror neurons for empathy* play a definitive and important role. But, there is more that makes this interaction a *happy* event

- When the mother *touches* Landon *endorphins* and *dopamine* are released in his brain. These *endorphins* reinforce attachment and pleasurable/rewarding feelings – the *dopaminergic reward processing system* is triggered.

Dopamine Pathways

Serotonin Pathways



Functions

- Reward (motivation)
- Pleasure, euphoria
- Motor function (fine tuning)
- Compulsion
- Perseveration

Functions

- Mood
- Memory processing
- Sleep
- Cognition

Also:

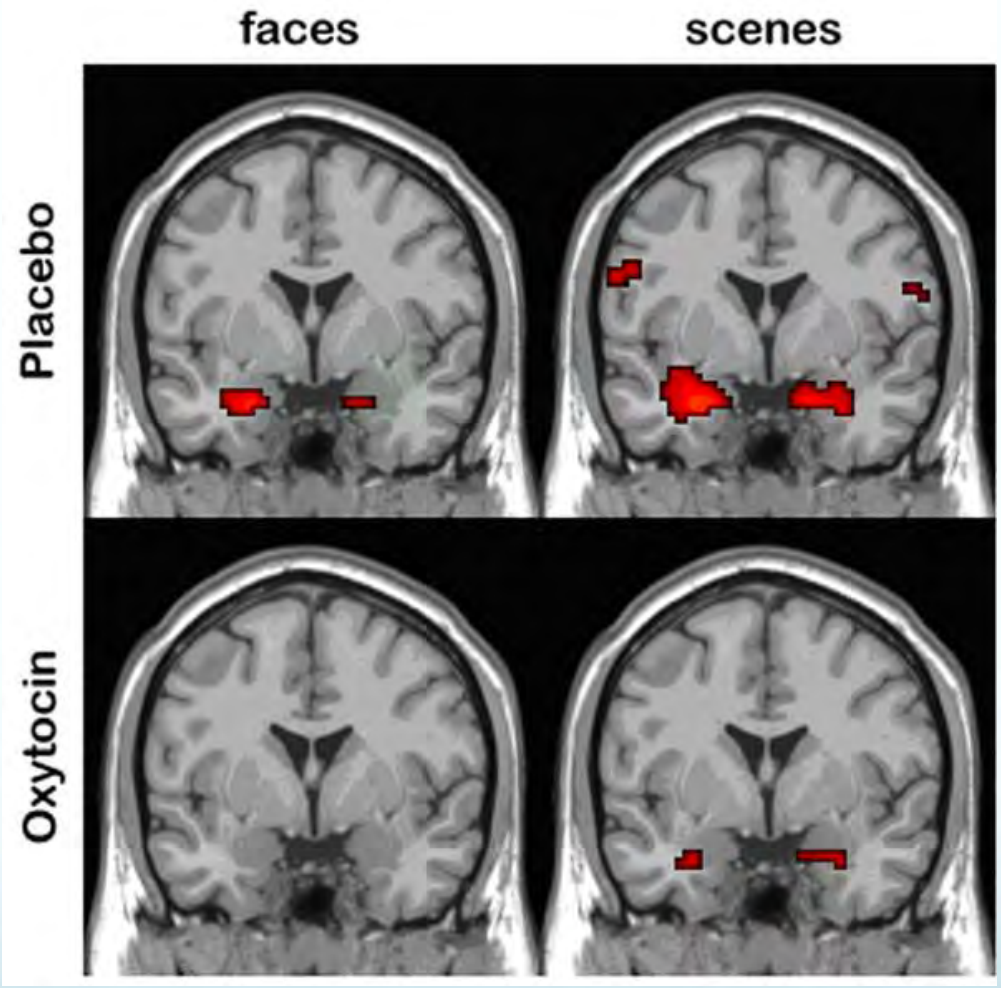
- *Oxytocinergitic* system is activated. (S*trathearn et al. 2009)* which adds to the complex bonding system.

oxycotin

Reduces

Activity

amygdala



- It has been shown that mothers of children with Charge Syndrome, with the most severe visual impairments, were under he most stress because of the mismatch of emotional status (Reda and Hartshorn, 2008)

- This mismatch is likely due to the fact that in children with very severe visual impairments the (visual) mirror system is very hard to activate. This causes stress both in the mother as well as in the child (Van der Gaag, 2007)

- In this case it is almost impossible for the child to understand the state of mind of the mother and as a consequence avoids the parent who wants to sooth the child (Macrae, 2003), who then “tries harder” to comfort the child (Howe, 2006). This can lead to “out-of-control care giving” and even abuse.

Mirror neurons:
An exciting Discovery?

Drummer boy

- A normal child of 2 ½ years of age is unable to drum slower than 75-100 beats per second.
- Kirchner & Tomasello (2008) asked the toddlers (N=36) to
- drum along with the experimenter
- drum along with drumming machine, which allowed them to see the beat on the drum
- To drum along with a radio

- The result of this experiment was that when the child drummed along with a person he was able to follow even when the tempo was < 75-100 beats.
- In the 2 other conditions this was not the case.
- It seems that is the *personal contact (joint attention) which* explains the rhythmitical synchronisation.

Monkey observing

- When one monkey observes, when sitting *motionless,* another monkey performing an *action,* it could be shown that a set of premotor neurons appeared to respond in both animals. (Rizzolatti et al. 2001)

Spiders on body

- If you watch this picture it seems that the spider crawls on our own body. (“tactile empathy”, Keysers et al. 2004)
- Here also the observation of actions and experiences of others, activates the (premotor) cortex of the observer.

- These 3 examples show the essence of ***mirror neurons.***
- *"whenever individuals observe an action done by someone else , a set of neurons that code for that action is activated in the observer's motor cortex" (Rizzolatti et al.2009).*
- The observer is aware of the outcome of their motor acts, this means that he ***understands*** without cognitive mediation ***what the other*** is ***doing or feeling***

- Mirror neurons are not only localized in the pre-motor cortex, but also in areas involved in *vision and memory.*

- Let’s visit our little girl next door: Nova
- She is a 7 weeks old baby.
- In the first clip you can observe that Nova attempts to mirror her mother’s tongue protrusion

- The next clip is taken 4 minutes after the previous one.
- Mother looks at Nova. The baby put out her tongue as the mother has showed her before done

- Apparently the baby has remembered the previous occasion of mirroring her mother's tongue movements. Role of the hippocampus.
- It is likely that the baby after several days her memory will be activated when mother shows her face again in the same position.

- In the next clip, you can observe what happens when mother open and closes her hand. Notice that at some instance the baby put out her tongue as well

- There is no doubt how important the activation of the visual and motor mirror neuron system is.
- The foundation for motor and visual learning, in particular of imitation are very much dependent from the MNS.
- Through this system Nova will understand *emotions* of happiness or sadness when these are shown by the mother's face.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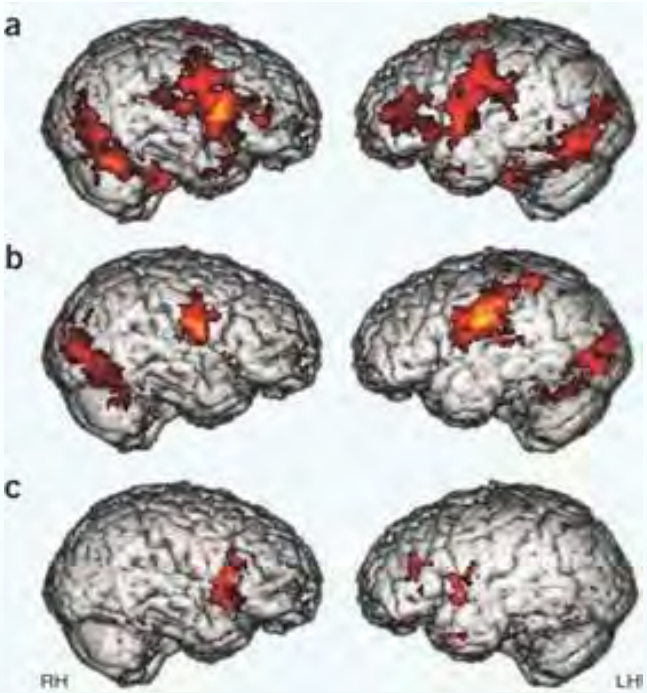
- MNS is responsible for the *joint attention* as shown in the drummer boy experiment, for *empathy, (*spider experiment*) social behavior and imitation* as demonstrated by Nova.

  All these behaviors are essential for developing *language.*

  When these behaviors fail to develop.....

- The child suffers from:
- Autism Spectrum Disorder.

- There is a growing evidence that the MNS is dys-functioning in persons with ASD. This is well illustrated in EEG and fMri studies.
- The following clip reveals the difference in brain activity of high functioning persons with ASD and controls in an imitation task.


a
b
c
RH
LH

- There is high prevalence of ASD in blind and deafblind children.
- Can this be explained by dys-functioning of the MNS?
- What role does vision and hearing play in the development of MNS?

- Cass (1996)and Sonksen (2002) studied 32 children whose vision had regressed between 16-27 months to blindness. However one group still could "recognize" a face, while the other had no "face recognition at all".
- It was shown that in the latter group ASD features (lack of joint attention, imitation and referential language) were far more prominent ($p<.0001$).

- The (absent) role of the MNS in these behaviors is striking.
- Does this mean that we as human beings need vision to represent other people's action in our mind?
- The answer is "no"
- Ricciardi et al. (2009) found that through hearing and touch the MNS can recruit a part of the *visual*(extrastriatic) cortex to represent actions of other persons.

- As been shown by Cass and Sonksen vision, in particular of the face (Van der Gaag, 2007) facilitate the imagery of other persons actions.

- How would this theory work for deafblind people?
- If there is any vision or hearing left, which is often the case, by "resonance" activities the MNS both for vision and hearing can be activated.

- It has been mentioned that touch as it is used in every days activity are not sufficient to activate the MNS.
- However hand-*under*-hand and hand-*over*-hand touching may offer opportunity to understand each other's actions "read" each other's mind and symphatize with each other

Dr. Jan van Dijk

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Assessment expertise

The Van Dijk Approach to assessing children or adults with multiple disabilities is unique, but it can be successfully implemented after a relatively short period of training.

Please direct requests for training to me. Materials can be obtained in the Webshop.

Read More

Forum Questions and Discusions

Would you like to discuss specific issues about deafblindness and receive critical feedback from colleagues of the Expert Team, other professionals, parents, or people with deafblindness?

Go to our Forum. We have ongoing discussions on:

- General Deafblindness
- Syndromes
- Challenging Behaviours
- Assessment

You need to be registered to have forum access.

Register

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- Download Overview

Book Van Dijk Approach

People who watch me assess a child with multiple disabilities often wonder about the structure of my approach. They know I try to "follow the child," but the direction this process takes is sometimes unclear.

A guidebook/manual with double DVDs has recently been published, called Child-guided Strategies: The Van Dijk Approach to assessment For Understanding Children and Youth with Sensory Impairments and multiple disabilities (2010).

The assessment's eight domains are well described, and clear suggestions are given for writing an assessment summary and designing a child's Individual Educational Plan (IEP). One of the accompanying DVDs demonstrates the assessments of 3 children with multiple impairments.

Read Comments Visit Webshop

Actual news on Jan's Blog

Talking Sense is a magazine about Deafblindness in the UK. In the Winter-edtion of 2010 you can read an independent review by Patricia Gibbons about the manual "Child-Guided Strategies: *"The Van Dijk Approach to Assessment"*

Read more

Expert Team

Although I have a pretty good overview about what is happening in the area of multiple sensory impairments, the field is so broad that other experts are needed to help keep this web site up-to-date.

My Expert Team will help answer the questions people ask in the in the Forum.

db Expert Team

www.drjanvandijk.org

- Articles:
  - Deafblindness general
  - Syndromes
  - Challenging Behaviour
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Challenging Behaviours Only for topics about Challenging Behaviours	1	2	by Jan van Dijk on Nov 04 2010, 22:54
Assessment For all your Assessment topics	1	2	by Jan van Dijk on Aug 29 2010, 17:21
Syndromes For topics about Rubella, Usher, Charge or other Syndromes	0	0	No posts
CD and DVD Only for technical questions DB related topics belong in above categories	0	0	No posts

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Parent Support Group

The idea of this group is to create a match between a parent seeking personalized support from another parent who has experienced the same challenges. We are parents willing to listen, provide emotional support and information through shared, similar experiences. Together, we can decrease stress on the family, and increase knowledge.

Created on: Saturday, 20 November 2010

6 Members 0 Discussions 3 Wall Posts

Expert Team - Forum panel

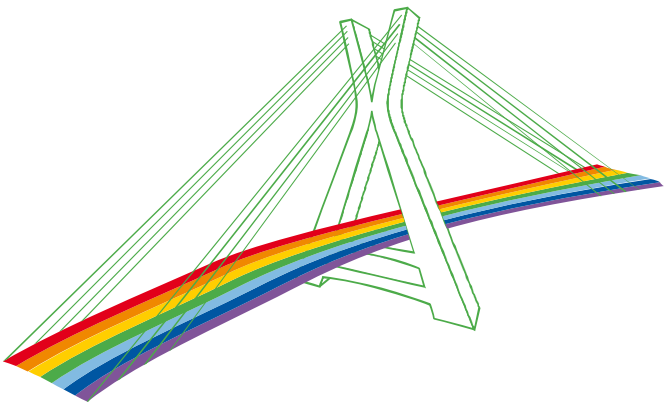
This group is the Forum Panel and Expert Team of this website. The members are co-authors of the text of this website; they work together intensively with several studies and project. They publish articles together and visit international events.

Created on: Wednesday, 30 June 2010

9 Members 1 Discussion 1 Wall Post

End

Discussion



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Sesión Especial

Nuevos entendimientos en el cerebro limbico humano y como puede cambiar la aproximacion educativa en personas sordociegas

Jan van Dijk (profesor Dr.emeritus) Holanda

Tradicionalmente la educación de niños sordociegos está enfocada en el desarrollo de la interacción y comunicación. Frecuentemente estos objetivos se alcanzan por aplicar las técnicas de aumentar el uso de objetos, dibujos y símbolos más formales como signos (táctiles). En el mundo los resultados de estos intentos son decepcionantes. Tanto el lenguaje comprensivo como expresivo no se ha aumentado encima de un nivel concreto o de "ahora y aquí". No solo eso un número significativo de estas personas muestran unas conductas indeseables, por ejemplo auto abuso, estrés y retirada extrema. Después de medio siglo de trabajar en el campo directamente o como científico, sigo buscando como mejorar la calidad de vida de estas personas. Esto se puede encontrar en el campo de la neurobiología. Hay evidencias convincentes de las raíces de la interacción sincrónica entre el adulto y la persona (con sordoceguera) se puede encontrar en el rol de espejo de las neuronas. EL sistema también explica las bases de empatía entre las personas. Se ha demostrado el rol de la amígdala (cerebral) en personas con ceguera, relacionada con la conducta de "aproximación" y retirada (miedo) difiere significativamente de la de personas videntes normales. También hay evidencia que el sistema regulador del estrés difiere en personas con múltiple impedimento sensorial y personas sin múltiple impedimento sensorial. Todos estos procesos están representados en el "cerebro viejo", que es el que maneja las emociones. En estos los llamamos áreas límbicas de nuestro cerebro las fundamentos están recostados en la vida emocional saludable. El sistema límbico esta en los dos lóbulos en áreas corticales en particular en estos para atención, motivación y comunicación con otros. Tradicionalmente los métodos educativos (currículo) se enfocan en la estimulación de estos aspectos en el aprendizaje, sin considerar el rol esencial del sistema límbico. En mi presentación mostrare un video como la aproximación baja-alta (límbica) más que una arriba- abajo (dominada por educador) abre las nuevas perspectivas en la (Calidad de) vida de las personas con múltiple impedimento sensorial, incluyendo sordoceguera.