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Autism: is there a place for ReAttach therapy? A promotion of natural self-healing through emotions rewiring
Edited by Paula Weerkamp-Bartholomeus

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Giovanni Fioriti Editore s.r.l.
Via Archimede 179 – 00197 Roma
Tel. 068072063, Fax 0686703720
info@fioritieditore.com
www.fioritieditore.com
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Autism: is there a place for ReAttach therapy?

A promotion of natural self-healing through emotions rewiring

edited by

Paula Weerkamp-Bartholomeus

Contributors: Soren Petter, Ashutosh Srivastava, Michael Fitzgerald, Donatella Marazziti, Alexander B. Poletaev, Vladimir Trajkovski

Giovanni Fioriti Editore
Roma

Authors

Paula Weerkamp-Bartholomeus, ReAttach Foundation, Waalre, The Netherlands.
President and founder of ReAttach Therapy International Foundation. Graduated in 1986 at RU Utrecht University in Educational Psychology with a differentiation in Developmental Disabilities. From 1986 until 2011 she worked in a private practice where she performed action-oriented diagnostics and interventions for children, adolescents and adults with complex developmental challenges.
She has developed the ReAttach intervention as a schema therapy for adults and children with a variety for ASD and a variety for developmental disabilities. Additionally she introduced the method in the field of neurorehabilitation and psychogeriatrics.

Michael Fitzgerald, Trinity College, Dublin, Ireland.
Professor Dr. Michael Fitzgerald was the Henry Marsh Professor of Child and Adolescent Psychiatry at Trinity College, Dublin. He is the first professor of child and adolescent psychiatry in Ireland specialising in autism spectrum disorder (ASD).
He has diagnosed over 3,000 persons with ASD. He is a Clinical and Research Consultant to the Irish Society for Autism and an Honorary member of the Northern Ireland Institute of Human Relations.

Donatella Marazziti, University of Pisa, Pisa, Italy. Adjunct Professor of Psychiatry, Dipartimento di Medicina Clinica e Sperimentale, Section of Psychiatry, University of Pisa, via Roma 67, I-56100 Pisa, Italy; telephone: +39 050 2219768 - fax: +39 050 2119787 - e-mail dmarazzi@psico.med.unipi.it; Scientific Director of Brain Research Foundation Onlus, Lucca, Italy.
Dr. Marazziti is member of the WPA section for OCD, member of the International Council for OCD, secretary of the Tuscany section of the Italian Society of Psychiatry and of the Italian Group for OCD and related disorders, member of the executive committee of the ECNP and of the educational committee of the CINP. She is also foreign advisor of the OCD foundation.

Soren Petter, PsychWise Associates, Kent, United Kingdom.
Dr Soren Petter is a Consultant Psychologist and Psychotherapist with 20 years of clinical experience in psychiatric inpatient and outpatient settings, as well as corporate stress-management and prevention consultant, he manages a psychological consultancy in central London. He is a former faculty member at Regents University London, now a visiting lecturer at the University of Surrey and City University London, as well as a research supervisor for organisational salutogenesis at the University of Gloucestershire

Alexander B. Poletaev, MRC "Immunculus" Moscow, Russia. P.K. Anokhin Res. Inst. of Normal Physiology RAS, Moscow, Russia.
Medical Doctor, Professor, Immunologist. Author of more 200 publications.

Boris A. Shenderov, Research Institute of Epidemiology and Microbiology after G.N. Gabrichevsky, Moscow, Russia

Ashutosh Srivastava, PsyUni Trust, New Delhi, India.
Dr. Ashutosh Srivastava is a Practising Clinical Psychologist with over 10 years of hands-on experience in the sphere of Behaviour Analysis, Psychotherapy, Counselling & Training. He is currently the President of Bharatiya Counselling Psychology Association and one of the Board Members of the ReAttach Therapy Foundation. He is MPhil in Clinical Psychology and PhD in Psychology with specialization in Psychological Profiling of Audience. He is the Executive Director of Psyuni Trust (India) and his organization is working meticulously to promote mental health among children, women and various deprived and marginalized groups in India.

Vladimir Trajkovski, M.Sc., PhD. Institute of Special Education and Rehabilitation, Faculty of Philosophy, University "Ss. Cyril and Methodius", Skopje, Republic of Macedonia.
He is Editor-in-chief of the *Journal for ReAttach Therapists and Developmental Disabilities*. He is a graduate of the Faculty of Medicine in Skopje (1994), where he later obtained his (1999). President of Macedonian Scientific Society for Autism since 2005. He introduced subject Autism in the postgraduate curricula at the Faculty of Philosophy. His research interest are genetic and physiological aspects of autism spectrum disorders, but he has also published in the fields of human genetics and medical aspects of disability.

Corresponding author
Paula Weerkamp-Bartholomeus
ReAttach Foundation
E-mail reattachfoundation@gmail.com

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Preface

Sentimus ergo sumus: we sense therefore we are. ReAttach

Michael Fitzgerald

ReAttach is a therapeutic method characterised by Paula Weerkamp (Weerkamp-Bartholomeus 2015). She points out that, "'individually', there are many differences in psychological functioning. ReAttach is focusing on the similarity in cognitive processing of information, emotions and events. The underlying structure of ReAttach is based on ortho-paedagogical influencing, obstructing factors and facilitating optimal conditions for cognitive functioning and growth. ReAttach for autism is made up from the following components: arousal regulation, tactile stimuli and joint attention, multiple sensory integration processing, conceptualisation and cognitive bias modification".

The ReAttach model helps create a, "sense of cohesion within and between people, fostering multi-sensory-processing and reducing maladaptive schemas, splitting and fragmentation".

It is an integrated therapy. The days of the single therapy psychoanalysis, behaviour therapy etc, are past; the future is integrative in therapy and this is what makes ReAttach therapy so important. It deals with the complexity of the therapeutic encounter in the way that all the single modality therapies fail to. It is a twenty first century therapy. It is the future of therapy. The reason for the lack of success of the single model therapy is that they do not deal with the complexity of the patient's need for therapy and the complexity of the presentation in terms of psychopathology.

One of the other important aspects of ReAttach is that it takes a dimensional approach, rather than the old out of date categorical approach of the nineteenth and twenthieth century. This had ideas of separate psychiatric diagnosis and these have not been confirmed. There is overlap and comorbidity for most patients and they are on multiple dimensions. ReAttach takes this into account. The old categorical approach

missed the critical overlapping nature of most psychopathology because of the overlap and comorbidities. These were not dealt with by the old outdated mythical single categories and were also not dealt with by the single model therapies. As the former Director of the National Institute of Mental Health in Washington stated, research now in psychiatry has to be cross-diagnostic, is critical of DSM V from the American Psychiatric Association. This is exactly what the ReAttach model is doing and why it's so critical for the future of psychotherapy and deserves intensive scientific research to be conducted on it. It's no doubt that a therapy that's integrated, is going to have a better outcome and there's already some evidence for this. ReAttach is a new breakthrough therapy.

An important chapter in the book by Soren Petter is on improved ontogeny which focuses on what is known by human functioning and existing, makes the critical point that for ReAttach that, "sensing and affect precede cognition developmentally speaking, and therefore sensing, "Sentio", before thinking, "cogito". This is the most critical and innovate part of the ReAttach approach. Sensing has been hugely ignored in single model cognitive therapy and one of the reasons for the reduced success rate. As O'Connor Drury, (1996), pointed out, that there are Dangers in Words. This was a huge issue for Ludwig Wittgenstein as well, (Wittgenstein 1958, Fitzgerald 2000). Language is bewitching and mythologizing sentio (is solid). I fully agree that ReAttach would replace the, "Cogito, ergo sum", with a, "sentio, ergo sum", as it believes emotions to precede cognition". This is a major breakthrough in psychotherapy research. ReAttach also points out that, "sensing and cognition are relational or interactive or as John Donne said, "no man is an island".

The chapter on Anxiety Disorder using ReAttach technique is very helpful in showing ReAttach therapy in its therapeutic model by Ashutosh Srivastava as is the chapter by Paula Weerkamp-Bartholomeus' chapter on autism treatment. The book also has a Russian viewpoint, and unfortunately, we don't read enough about the Russian viewpoints in terms of their hypothesis, their theory, their understanding, but this is remedied in this book by Alexander B. Poletaev and Boris A. Shenderov.

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Chapter 1

Indication of ReAttach within modalities of therapy: an improved ontology?

Soren Petter

1.1. Sentimus ergo sumus: We sense therefore we are

This chapter is written in an effort to explore where ReAttach as a method sits within the modalities of existing therapies, so that we may see what has been integrated in terms of established interventions, and what is being innovated by the model called ReAttach. The chapter is thereby written as an observation from the outside of applied Reattach therapy, in an attempt to describe the multipole therapeutic elements that can be observed, and how they overlap with existing therapeutic modalities. It is vital to understand that this is neither a comprehensive step-by-step guide to ReAttach therapy, nor the only way of conceptualising it, but one of various ways of making sense of the process of ReAttach. It is hoped that this way of making sense of it will allow for demonstrating how this model could be adapted to almost any given pathology, but further how it actually allows to think beyond the concept of discrete pathology by focussing on networks of symptoms that cut across pathologies.

As with any new intervention or treatment approach within the disciplines of health provision, the question that naturally emerges is the following: What is ReAttach, where does 'ReAttach' fit into care-pathways? Where does it fit in the conceptualisation of health and disease, in general psychopathology and psychogenesis, and further, where does it sit in our wider understanding of what is therapeutic, and why is something therapeutic?

Most therapeutic interventions, be they medical or psychological, can be roughly accommodated in a three-fold structure that constitutes models of therapy, defined by a model that moves from "Ontology" to → "Pathology" to → "Therapy":

Ontology: A model of what is known of human functioning and

existence

Pathology: A model of disease or distress, based on that model of human functioning

Therapy: A model of reversing or transforming pathology

In simplistic terms, each therapy model has a basic idea of how humans function, and based on that idea of normal functioning it recognises when humans are not functioning normally, and therefore develops a method to understand and correct the malfunctioning aspects, called pathology. Whilst this might appear to be a somewhat reductionist or positivist approach, early pioneers of general psychopathology or descriptive psychiatry, such as Karl Jaspers (1913), would have already suggested a century ago that the basic ontology of human existence must involve both objective and subjective phenomena, therefore aspects of existence which are standard or transpersonal and affecting every human for that matter, as well as individual differences, which have to be understood in a given person's subjectivity.

When therapeutic models are understood in this three-fold structure of ontology – pathology –therapy, we make sense of how these therapies work internally, in terms of what these models assume about human nature, and thereby what they seek to achieve based on an understanding of the pathology or pathogenesis, that was derived from its ontology; its understanding of human nature.

In addition, having this understanding of therapy, one can move towards a clearer understanding of how the model can be researched and thereby evidence-based, for a given method of research, generically referred to as epistemology, is generally derived from understanding the ontology of any therapeutic paradigm.

Raising the question of what ReAttach presents, and where it fits in or differs from current treatment modalities, we shall start by aiming to understand its ontology, the model of being human, and what we believe to know about being human. Although many therapeutic traditions have distanced themselves from what came to be known as 'The Cartesian Split' (Crane and Patterson 2001), a belief in a distinction between body and mind, a dualism of some kind, most therapeutic traditions still rely on its undercurrent belief, by that we refer to the belief of the supremacy of the mind. Descartes' hypothesis of 'Cogito ergo sum', meaning 'I think thus I am', is based on the body mind split, and assumes existence and understanding originates from cognition, as the 'cogito' infers. Despite criticising this dualistic stance of body and mind, almost all psychotherapeutic efforts use the 'cogito' as their method of induction in therapy, meaning they rely on speaking, listening and cognitive restructuring of information, the creation of new meanings, in an effort to bring about change in the way people feel and sense.

Now, why would we use cognition as the main method of induction in

therapy if we want to move on from the Cartesian split, the 'Cogito ergo sum'? This is a particularly interesting question in the face of numerous research suggesting that human communication is in its vast majority innately non-verbal (Trimboli and Walker 1987), though this is debated by many. Why are we relying on cognitive or verbal induction when we believe communication to be largely non-verbal? This would seem a rather counter-intuitive vantage point. Interestingly at the same time, Psychology and Psychotherapy have often been in some kind of professional battle with medicine, and in particular psychiatry, accusing it to rely on the mind-body dualism too much by over- relying on medication. In psychiatry, which broadly relies on administering psychotropic substances as a method of therapeutic induction, we therefore have medication that modulates states of emotional arousal, such as dysthymic (low) – euthymic (normal/optimal) – hyperthymic (high), as well as attempting to regulate specific affects via manipulating the release of corresponding neurotransmission (Healey 2016). This manipulation of affect and arousal is believed to then regulate cognition in turn, and forms the core ontology of psychiatry. In short, here the assumption is being taken that modulating or manipulating affect and arousal will eventually change negative or mal-adaptive cognition. Interestingly, Healey (2016) also refers to early research, such as Eysenck or Pavlos, which evidenced that subjectivity or personality variables, such as Introversion or Extraversion, as defined by Jung, seem to be causing different responses in stimulant and tranquiliser use. In brief, a person's given personality changes the effect that these medications have. At a surface level, Extraversion versus Introversion almost reverses it, whereby an Extravert will experience a stimulant, such as amphetamines, as tranquilising rather than stimulating, which is how an Introvert would experience it. This however could also be indicative of a person's general arousal resting level. Either way, this way of treatment essentially reverses the 'Cogito ergo sum', 'I think thus I am'. It does so by starting with putting sensing and affect before cognition in the way it seeks to intervene. Therefore this paradigm can be conceived of as positioning ontology as 'Sentio ergo sum', meaning 'I sense thus I am'. This suggests that psychiatric ontology implies that sensing and arousal precede cognition in human existence, rather than cognition preceding emotion, a belief that many second wave Cognitive Behavioural Therapy (CBT) models where based on. In these CBT models it was attempted to change emotion by changing cognition first. Padesky and Greenberger (1995) famously called it 'Mind over Mood'. However, knowing that infants sense before they build structural cognitive representations or even structural language, this seems an unlikely ontological bias. ADHD specialist Brown (2014) draws on neuroscientist Dodge (1991) stipulating that all forms of cognitive processing are within themselves stimulated and initiated by emotions or affect, so are processes of organising, amplifying or attenuating cognition. So here again, the ontological position is that

our existence starts with sensing rather than thinking. One might argue that this has already been previously suggested by early psychoanalysis, in particular Freud, in his concept of psychic determinism, as Bateman (1995) points out, whereby unconscious processing precedes conscious processing, such as language and language-based thinking. Harari (2015) demonstrates that it is this capacity for language and linguistic (versus affective) narrative that truly distinguishes the Homo Sapiens from its predecessors and all mammals and reptilians, the mammals however sharing similar sensory and affect systems with the homo sapiens, as Panksepp (2004) indicates in his explorations of affective neuroscience. However, Harari (2015) equally observes that our capacity for language and narrative is potentially the most duplicitous and deceptive forms of information processing and restructuring that humans engage in. The verbal narrative allows for lying and the controlling of the minds of others, to an extent where humans have become more trusting of their thoughts or convictions than their senses. Due to its deceptive nature, language thereby opens the door to large amounts of creating pathological splitting, divisive narratives and cognitive bias, as it is a way of sensory processing that allows for deception of self and others much more than non-verbal communication may do. This is beautifully evidenced by the contemporary construct of creating 'fake news' in an effort to create societal rifts and oppositions.

Summarising, what is evident from both the above ontological positions, 'I think thus I am' versus 'I sense thus I am', is that any given ontology to understand human suffering, pathogenesis, or health, salutogenesis, has to factor in that our existence is experienced and determined both by sensing and thinking or cognition. The modality of ReAttach takes the position that this is the case, however firmly believes that sensing and affect precedes cognition developmentally speaking, and therefore positions the sensing, 'Sentio', before the thinking, 'Cogito'. However, ReAttach, more so than the above mentioned paradigms, believes sensing to be relational in nature. This has been demonstrated by Cozolino (2014), who shows that sensing and learning to process sensing, is an utterly relational phenomenon, located in the attachment constellations that we exist in, or in his words the social synapse. This would also correspond to Wolynn's (2017) notion of transgenerational trauma being passed on at a non-verbal level, drawing on Hellinger's family constellations theories. One cannot understand a persons' sensory processing, affect and indeed linguistic narrative as an isolated variable or phenomenon, but has to always see it as both a result of attachment or relationality, as much as a necessity to negotiate the relational space and attachments which we exist in. This also afflicts formal language, for language is always given to us by others, those who educate and raise us, it is never from within us, unlike affect and sensing. Indeed, languages or language cultures by themselves can be argued to already present ontological systems by

themselves or within themselves. For example, the nature of language is such that the amount of words that we have and what these words describe does to many of us constitute what is true or not, what exists or not. If we have a word for it, then it must exist, if we do not have a word for it, we doubt the existence of something, or it's very meaning. When we sense but cannot logically explain, we experience something as what Freud called 'unheimlich', literally meaning 'unhomely', something that we are not at home with, often translated as the uncanny in English. But even here in the world of words and shapes given to us by language and education, we encounter phenomena that we only identify through their relationality or context. For a cloud for example has no defined or specific shape. If we however draw a random shape next to a moon or a sun in the sky, we would all claim that that shape is a cloud, now that it is defined by its relationships to moon and sun. ReAttach believes the same thing to be true for human sensing including cognition, it is a relational phenomenon and has to be experienced and understood as well as helped in that context relatedness. Additionally, one has to hold in mind that we are already a relationship within ourselves due to the fact that we think about ourselves. Sartre (1956) referred to this as the duality of the mind. We are internally and externally relational. Whilst Sartre denied the Freudian model of the unconscious, even a classical Freudian set-up of the mind, consisting of Id, Ego and Super-Ego (Bateman & Holmes 1995), would indicate that we are internally relating to ourselves, here it is merely a matter of whether we do this consciously or not.

This then leads us to the next ontological dilemma, we are not an 'I', not a nuclear entity, as the 'sum' in Latin indicates ('I am'), but rather I am a 'we' internally, and a part of a larger 'we'. Therefore my ontology, pathogenesis and salutogenesis shall have to be understood in this context. Somehow this should seem glaringly obvious, for just about any psychological or psychiatric problem seems to originate or manifest in the context of a relationship, either to oneself, another person or persons, one's body, a substance, and so on. It is always about negotiating a relationship with something or someone. One of the models that indeed initially inspired ReAttach was Schema Therapy (Young et al 2006), which was already going in this direction by fusing ideas from Bowlby's attachment theory, Klein's Object relations theory and CBT, however continuing to rely on cognition as the inductive therapeutic method. The universal interconnectedness of existence is already beautifully expressed by the African philosophical concept of 'ubuntu', often used by Desmond Tutu in his social initiatives and endeavours. Gade (2012) describes ubuntu as a reference to humanity whereby there is a universal bond that connects us all, often captured in the phrase or translation 'I am because we are'. This ontological positioning of 'I am because we are' forms a central believe or assumption of the ReAttach model, that is that our existence, suffering and health, as well as therapies, can only be

understood and be delivered in relationality. If we bring all these beliefs together then, ReAttach would replace the 'Cogito ergo sum' with a 'Sentio ergo sum', as it believes emotion to precede cognition. Moreover however, it believes these processes to be collective and inter-connected, and therefore the 'I' needs to be replaced by a 'We'. This essentially then creates the following ontology for ReAttach:

"Sentimus ergo sumus": 'We sense therefore we are'

This is, in an over-simplified way, what ReAttach believes to be true about human experience and existence. And because it believes this, that we are primarily sensing before we think, it positions the manipulation of sensing, affect and arousal as its primary method of therapeutic induction. Only once this is achieved, then language and cognitive restructuring is added, in order to facilitate a process nowadays often described as mentalisation. Having now defined 'We sense thus we are' as an ontology for ReAttach as a model, we can return to our question of where the threefold structure of therapeutic models, this being *"Ontology → Pathology → Therapy"*, places the model of ReAttach in a wider sense. The following is then indicated:

1. **Ontology:** ReAttach ontology suggests that what we know about human existence is that sensing and arousal originally precedes cognition, and that both sensing and cognition are relational or interactive rather than nuclear in nature.
2. **Pathology:** ReAttach pathology would therefore believe that problems arise from mentalisation problems, unproductive associations between arousal/affect and cognitions, and in a larger sense, sensory-processing-integration problems. An additional pathological concept might be the dangers of cognitive overreliance and affect/arousal muting or dismissal, as potentially correlated with autoimmune disorders and neurodegenerative phenomena. This causes fragmentation and a loss of cohesion and integration.
3. **Therapy:** By definition a model is used here that addresses the above dilemma, however rather than just reducing specific symptoms, the model of Salutogenesis (Antonovsky 1987) is indicated, therefore expanding health rather than just reducing symptoms. The short hand formula for this is helping create a sense of cohesion within and between people, fostering multi-sensory-processing and reducing maladaptive schemas, splitting and fragmentation. This would lead to healthy internal relations to self and reduce distress arising from proximity to others. Indeed proximity to others itself can become a salutogenic variable if experienced as pleasing, rewarding and connecting rather than fragmenting, in short optimising attachment constellations and people's capacity for psychic proximity to self and others. The method of therapy shall there-

> fore fuse both the manipulation of affect and arousal, as done in psychotropic science, and the restructuring of meaning and cognition, as in most psychological therapies. The manipulation of affect and arousal shall be the vantage point of interventions due to the belief that it precedes cognition, the manipulation of cognition and fostering of mentalisation shall follow the manipulation of affect and arousal.

This concludes then the positioning of the model of ReAttach as a therapeutic paradigm. It leaves the question of how this can be achieved in detail, how it applies to treatment across networks of symptoms, or how indeed it might become salutogenic, meaning generally health- and cohesion fostering. In order to demonstrate how ReAttach seeks to achieve what it endeavours to achieve, the ReAttach core interventions are explored below and put in the context of existing models.

1.2. The core-interventions in ReAttach and what they might aspire to achieve

We shall now look at what can be observed about the different elements of ReAttach therapy in the way it is currently delivered in the teachings of Paula Weerkamp (Weerkamp-Bartholomeus 2015). As stated earlier in this chapter, this is not a comprehensive description or step-by-step guide to ReAttach therapy, but rather one clinical analysis by the author as an observer and practitioner.

Based on these observations, it is suggested that the following processes are core elements of the ReAttach intervention:

a) Joint attention and connection
b) Proactive arousal and partial affect regulation
c) Optimal schema processing, threat activation and de-activation
d) Cognitive bias modification
e) Sensory and narrative differentiation, Re-narrating

Joint attention and connection

Joint attention and connection in ReAttach are achieved by making actual physical contact with the patient, namely by sitting opposite the patient while touching the outside of their hands, specifically tapping them on their hands. This process is initiated by a brief period of eye contact and the instruction from clinician to patient to follow this clinicians' voice and close their eyes if they are comfortable to do so. What can be observed here is that there is an attempt to set up a secure way of being attached and having joint attention, which is by research predicted

to be optimal for learning. There further is the building of a connection on three sensory levels, touch, auditory and optical. Due to the physical proximity an olfactory sensing may take place. In terms of other models of therapy, an optimal mode of relating is what is being pursued here. This might directly correspond to the variable of 'quality of relationship', which has been reported as a major change variable, if not the major variable, by mountains of psychotherapy outcome research. Further, the proximity and connection may also create the experience of resonance in both parties. This might correspond to core variables of therapy such as sympathy or compassion, originally suggested by Freud's contemporary Sandor Ferenczi (1932, published 1999) as a sine qua non, and nowadays by Gilbert (2005). Freud who believed in frustrating 'transference needs' famously had a fall-out with Ferenczi over this notion. In the 1960s empathy was a constituted core condition for change by Carl Rogers (2003).

Proactive arousal and partial affect regulation

As outlined earlier, one of the aims of psychotropic medications is to regulate arousal in the central nervous system (CNS) and by impact in the peripheral nervous systems (PNS). Thereby, psychotropic medications have often been clustered in groups of medications that seek to do exactly that, namely stimulants, minor and major tranquilizers, mood-stabilisers or anti-convulsants, as Healey (2016) points out. Other groups exist, however, with these three main groups above, a clear structure emerges. There is a clear effort here to either increase arousal (stimulants), decrease arousal (tranquilisers) or fix arousal (stabilisers). A potential problem to be considered with this way of medicating could be potentially prolonged periods of arousal regulation while a substance is being taken. While this prolonged regulation might very well be very important or relevant if not absolutely important for some clinical presentations, shorter and more fine-tuned arousal regulation periods might be an alternative option, as equally mirrored in psychopharmacological interventions where medication is being 'prescribed as needed', for example only when the patient deems it necessary, or in the case of for example short-acting stimulants or anxiolytics only at specific day times or in periods of increased distress or cognitive demand.

ReAttach has developed a similar concept, whereby it uses three levels of arousal by stimulating the PNS and by feedback the CNS. This is achieved through varied frequencies of tapping on the skin. The levels are:

- Optimal arousal, also referred to as 'play mode'
- Low arousal, reflective, 'soothing or mentalising mode'
- Hyperarousal, 'threat-activation/mania mode'

These interestingly also very much map onto Gilbert's (2005) model of emotional regulation, whereby he refers to *a drive system* which triggers dopamine, a soothing system releasing opiates and oxytocin, and *a threat system* which triggers adrenaline and cortisol. So indeed, here in ReAttach we also have a means to arousal going up (stimulate), arousal going down (tranquilise), and optimal or stabilised arousal. These could interestingly again be compared to the structure of mood as in the concepts of Dysthymic – Euthymic –Hyperthymic. This may have further implications, for not only do we have a dopamine hypothesis for both ADD and Psychosis, Yehuda and Bierer (2008) pointed out that children of parents who suffered from PTSD present with genetically lower cortisol levels, increasing their own risk for PTSD. Stimulation of cortisol thereby is also a relevant tool. What seems of utmost importance here however is that In ReAttach, one can manually take a given patient through these arousal states within a matter of minutes potentially without using medication. The risks of that have been discussed both in problems with long- and short-acting release stimulants used in ADHD for example, and dopamine inhibitors in psychosis and Borderline Personality Disorders, or sometimes in OCD (Healey 2016). We know that while these medications have some positive impact, they might equally at times produce some negative effects through the prolonged fixing of arousal states. In ReAttach however, we might have at our fingertips the option of stimulation, tranquilisation and stabilisation, within very short spurts. This intervention by itself can function as treatment already where arousal regulation is indicated in order to foster a patient's capacity to engage in reflective thinking for therapeutic purposes.

In addition, ReAttach utilises the evidence base that tapping with the right amount of pressure triggers the release of oxytocin, which by its release fosters trust and safety in a patient, as suggested by Moberg (2003) amongst various others. This again corresponds to research that has identified trust in a trusting therapeutic relationship as the main agent of change. Conversely, over-pressured tapping can induce both cortisol and dopamine release, which equally impacts attention.

The context of tapping however has wider therapeutic intentions. Firstly, The ReAttach therapist creates joint attention with the patient, joint attention being vital learning and mentalisation as per pedagogic theory. Further, the continued physical contact of the therapist sitting opposite the patient tapping while tapping them actually produces an ongoing sense of being attached in the PNS and by feedback in the CNS. This is exactly how babies first learn to feel attached, by touch, before ideally they learn to mentalise the feeling of being attached and transform it into a mental state. Once this is achieved, we do not necessarily require actual touch as a 'PNS evidence' for being attached. Further, the ReAttach therapist sits opposite the patient in a fashion whereby two bodies mirror each other, without being neither too near nor too far, in order to be

safely attached. The author refers to this phenomenon as *perfect proximity*, close but not invasive. This in turn mirrors the safe attachment as per attachment theory, and thereby models something new in an effort to modify insecure, ambivalent or disorganised attachment constellations.

Concluding this brief exploration of *Proactive Arousal Regulation and partial affect regulation* then, this base intervention of ReAttach can regulate arousal, trigger oxytocin and mimic safe attachments while creating joint attention. These aspects we know from research knowledge are agents of therapeutic change, in addition to the creation of new meanings, behaviours and catharsis, as Grencavage and Norcross (1990) indicate in their review of common factors in therapy. The creation of new meaning, cognitive restructuring and new behaviours is addressed in the following steps of ReAttach. Furthermore however, it offers a new door to move away from distinct pathologies, but to start building networks of symptoms that correspond to these three arousal states. Specifically, problems with processing in terms of sensory and arousal difficulties could be the main assessment vantage point, and the specific problems within arousal regulation and sensory process integration are merely individual differences based on personality and epigenetics. Most psychiatric assessments indeed start with both, a mini mental state examination which investigates functional cognitive processing. They then apply mood or arousal assessment, such as Beck's BDI and BAI or PHQ9 and GAD7. Both of these measure dysthymic symptoms (depression) or hyperthymic symptoms (anxiety, stress, obsessionality), also referred to as hypervigilance.

Here then, there is an awareness that difficulties in cognitive processing and arousal regulation are at the core of distress or malfunctioning, evidenced by patients spending excessive amounts of time being either too hyperthymic or dysthymic or sometimes both. In ReAttach, one could simply start off with this phenomenon, and then apply further psychological theory to develop ReAttach interventions, such as using Young's schema therapy for example, who illustrates that people have different coping styles when engaging with distress arising from difficult cognitive perceptions. In simplistic terms, he argues that people might *surrender* to a difficult schema, *avoid* it or *overcompensate* for it. Based on this map of coping styles for example, a hypothesis could be investigated whereby OCD type anxiety could be conceived of as a form of compensating a schema, GAD as a form of surrender to a schema, dissociative anxiety or rage as a form of avoidance of a schema. In this hypothesis or tentative conceptualisation, these states have in common hypervigilance and hyperarousal, therefore rather than treating OCD, GAD, PD or otherwise, one could consider to start with mapping out why a given person is in hypervigilance based on their mode of dealing with a schema or trigger. This is not to suggest that there are no other psychological phenomena unique to GAD, OCD, PD

and other presentations, which might be deeply rooted in personality, personality traits or the history of pathology, nor is it suggested that these other phenomena do not require clinical attention. However, from a vantage point of networks of symptoms, this conceptualisation offers a route to starting clinical interventions which connect arousal regulation to schemata, and thereby a map to design tailor-made interventions as a starting point to psychological treatment. In ReAttach this could be quite easily addressed by adjusting the cognitive bias modification as will be explained in the sections after this.

Similarly, briefly returning to Jung's early personality theories, on could apply Brigg Myers MBTI personality assessment categories (Brigg Myers 1998) to this phenomenon. Vastly used in occupational personality assessment, the MBTI maps a given person's prevalence of focusing their attention on the scales of Introversion versus Extraversion, Sensing versus Intuition, Thinking versus Feeling and Judging versus Perceiving. Here we would have a map of attention focus and reliance for each individual which might easily explain the nature of their tendency for hyperthymia or dysthymia, and how a given cognitive bias modification may address this. As mentioned earlier, we already know that the mere difference in prevalence of Introversion over Extraversion or vice versa, can reverse the effect of dopamine stimulation. Adding to this an overreliance on thinking or feeling could further elucidate phenomena present in processing difficulties. Many more theories could be applied here, but these are just some introductory thoughts on the potential that arises when we enter therapy by modulating affect before we apply cognitive induction or restructuring.

Optimal schema processing, threat activation and de-activation

Once joint attention and arousal regulation is in optimal mode, the ReAttach intervention seeks to start by allowing patient to process or rehearse concepts, objects or schemas during *optimal* arousal or the *play* mode, both referring to the same frequency of tapping whereby the CNS is assumed to engage concepts in an 'emotionally safe' way, in a 'playful way'. Concepts, social concepts (people), objects or schemas here refers to mental representations, meaning either individuals or groups of people, relations, places, but can also include emotional concepts such as *'fear'* or *'pressure'*, or activities, such as *'performance'*. As Bateman and Holmes (1995) would point out, drawing on object relations theory, pretty much anything can be an object to the mind. Our capacity to successfully relate to our internal objects and to external objects (through internal representations) or concepts is dependent on our capacity for mentalisation (Bateman and Fonagy (2016)). Where people are concepts, that is often the main focus of this step, a patient can learn to think about others in a playful way under controlled arousal, and can even imagine that they are the

other person thinking about themselves. This in turn may help both with building theory of mind, a central problem in presentations of Autism and ADHD (Korkmaz (2011)), as well as psychosis, further potentially in presentations of Personality Disorders (Bateman and Fonagy 2016). Not only does this part of the intervention therefore help with theory of mind and mentalisation, as it allows people to learn to think about feelings rather than just feeling them, it also indirectly again helps with optimising attachment and feelings around attachment. In this step the clinician can get the patient to rethink or reprocess a whole family for example, by getting the patient to think of their mother, then getting them to pretend that they are their mother thinking of themselves or their father etc. They could also think of specific events or pretend they are in that event thinking of themselves. A clinician can also factor in options for transgenerational or constellations work. Wolynn (2017) illustrates the potentially transgenerational nature of trauma or affect dysregulation, including inherited pre-dispositions such as low resting cortisol. Using this paradigm, a patient can think through a line of two or three generations. A male patient for example could think about their father, then, pretend they are their father thinking about their father's father (the patient's grandfather), and then backwards, meaning pretending they are their grandfather thinking about their father etc. As evident here, the focus is on schema or concept processing without interference of hypervigilance or threat. Any mental relation to just about any mental representation of the patient can be reprocessed that way under optimal arousal levels and in safe attachment proximity with oxytocin being triggered. Thereby new understandings can be mentalised, while objects, schemas, concepts or people that may trigger hypervigilance or rage for example, both hyperthymic in nature, can be proceed without high arousal or hypervigilance being triggered in PNS and CNS as the arousal is partially regulated by the clinician. Thereby this method allows to slowly '*de-alarm*' mental representations that would have historically been inflammatory to the patient. Not only does the patient's threat response reduce, moreover their attachment constellation to the object is being reconfigured, while theory of mind is hypnotised to advance. So this step of ReAttach corresponds strongly to constellations theory, attachment theory, object relations theory, mentalisation theory, systems' theory, to name but a few. It conversely however also allows for activating trigger objects that should cause threat-activation or hypervigilance, by increasing the tapping to high arousal. Where threat or alertness and focus is missing in a patient, it can be introduced. Again this is particularly interesting for patients who struggle with clues, threat detection or genetically low dopamine or cortisol resting levels. Activating threat can also hyper-focus the patient for a cognitive bias modification as outlined in the next section.

Cognitive Bias Modification

ReAttach at current involves three different modes of what it refers to as *cognitive bias modification*, broadly referred to here as *adjusting concepts*, *learning new things* and *re-imagining life*. They are explained in detail in this and the next section. What they have in common is they are mostly delivered while setting the body into low arousal, so imagination, processing and mentalising can be calm, reflective and done in a state of feeling soothed, while the instructions for these cognitive bias modifications are largely given in optimal arousal to create playful focus. They are often preceded by instructing the patient to search for, or picture positive memories, in an effort to create openness to experience and activate long term memory.

The first layer, referred to as *adjusting concepts*, seems to strongly resonate with working on the psychoanalytic defence called primitive splitting, where things are either black or white, good or bad, guilty or innocent etc., the world of binary opposites in mental representations. It also initially might remind one of Padesky and Greenberger's (2005) thought records, which aim to achieve a more balanced view of threat-activating concepts via hypothesis testing and creating a balanced view. Again, here is an opportunity for de-alarming of obsessive and traumatic objects by getting a person to imagine and integrate all aspects of an event, concept or person, so that a more balanced mental representation can be mentalised, in an effort to reduce unnecessary fragmentation, primitive splitting or unnecessary hypervigilance or threat activation. Whilst this is applied to concepts and objects, it is also very powerful to optimise attachment to self and other, and by doing so reducing splits and divisiveness in families or groups. American essayist and writer Toni Morrison (2017) famously uses the term 'othering' of individuals or groups, in an effort to create both a sense of separation from them and mastery of them, and locating negative properties within others and thereby outside the self. This can be easily observed in sexism, racism, classism, homophobia, antisemitism, islamophobia; the list of 'othering' of groups and individuals is endless. *Othering* people means splitting and separating them from us, it creates ruptures, oppositionality and distance or separateness where we would hope to find cohesion and coherence. Of course this phenomenon is not just inter-personal, meaning in groups, but intra-personal, within a person, which gives us a schizoid form of existing, and in more severe cases dissociative identity disorders. On a social concept level then, this intervention allows to reduce splitting and fragmentation by having a patient process both good and bad aspects of self and others while accepting and making sense of the existence of both (binaries). Less or hopefully no threat is experienced as one is in low soothing arousal mode safely physically attached to the clinician. Advancing it, one can focus on communalities and differences in others

and aim to accept both, similar can be done for events and other mental representations, the possibilities are seemingly endless, and vastly cohesion fostering in general. Mental images of wholesome concepts can be created. The intervention can be followed up by inducting the patient of creating a memory of the adjusted concepts under low arousal. In relation to other models of therapy, here schema adjustment could take place as in Young's schema therapy, attachment to self and other could be improved, classic psychoanalytic defences can be worked with as well as CBT style cognitive bias modification being in operation.

Sensory and narrative differentiation: Re-narrating

The second layer of cognitive bias modification earlier on referred to as learning new things, is less obviously related to classic therapies that focus on symptom reduction, probably because it is a very salutogenic element, focussing on creating something new, rather than changing something. Yet, some people may liken it to *guided discovery*, *psychology of vision* or similar schools that utilise imagination to create experience and mentalise it. In short, a patient can learn things that might appear to be missing or helpful to have, such as compassion, assertiveness, self-respect, boundary setting, to give but a few ideas. In this case a patient would be asked to search for all or new ways to be assertive, put complex feelings into words, sooth themselves or have compassion with themselves. All of this would be dependent on what is being learned and mentalised. Equally however, this layer can be used to differentiate cluster cognition or emotions, in an effort to broaden out narrow emotional or cognitive concepts. One could for example broaden out the concept of success into smaller and larger successes, successes of the day and so on, in order to reduce compulsivity around over achievement. Where people are prone to *cluster emotions* and acting on them, such as in rage, one can ask the patient to search for all different ways of making sense of rage, such as fear, shame, disappointment, sadness, injustice and so on, so that mentalisation of rage leads to increased emotional literacy. From there the patient can be asked to find new ways of making sense of all these feelings, for example rage not being dangerous (a common cognitive bias), but a signal that one is hurt or threatened and that one needs to understand the nature of the experienced threat. This way, rage can for example be mentalised as a necessary alarm system to be understood rather than feared. If a patient could learn to put these feelings into words, they can then learn assertiveness (as opposed to aggression). We know from research that putting feelings in words, particularly those causing stress or distress, can vastly reduce felt pressure and produce therapeutic, this being supportive of ancient Buddhist Teachings (UCLA 2007). So here again we find another salutogenic variable. As in the previous section, the options of adjusting this layer of intervention are endless, and need to be

assessment based, as in any good therapeutic model.

The third cognitive bias modification, earlier on referred to as *re-imagining life*, upon first sight appears to be an intervention that seems destined for trauma interventions and rebuilding skills and resilience. It seems to strongly resonate with narrative approaches that seek to foster cohesive narratives, such as narrative therapy Michael White (1990) or narrative CBT by Rhodes and Jakes (2009), as it encourages the patient to form a new narrative about themselves. Different from narrative talking therapy approaches though, or the imaginary Tree of Life model as written about by Denborough (2008), the Reattach intervention focuses the patient on making their own movie about their life, beginning as far back as they wish. Parts of this may resonate with elements of the EMDR school by Shapiro (2001), however it is less specifically focussed than the classic EMDR intervention. In this layer of cognitive bias modification in ReAttach, the patient could be asked to make a specific movie, such as 'the assertive life', or 'the brave life', 'the playful life' or 'the safe life', however they can also make a movie without instruction, which may be much broader and creative in many ways. Where a patient has experienced specific trauma, context and situations could be re-imagined, again new skills could be integrated, and thereby a new mental narrative can be mentalised. Aspects of the above two interventions which may have preceded this one can already be also integrated, so attachments might be reimagined therein, one might be less anxious and more playful. Again, there would be endless options for both therapist and client to create and mentalise new things here, and if a more cohesive sense of self is being achieved, such as in the Tree of Life model, another salutogenic variable would have been utilised.

This concludes the basic elements utilised in ReAttach therapy. We shall now look at a very brief case study to illustrate both individual and systemic facets of the model before concluding this chapter.

1.3. A brief case study on systemic triangulated hypervigilance and ReAttach interventions

John, an Australian business consultant was referred to me via a Psychiatrist with high levels of anxiety, OCD symptoms, hypertension and serious migraines, and short spurts of dysthymic mood and profound grief. He had been previously unsuccessfully treated with CBT and SSRIs. He presented very restless, worked 15-hour days, had obsessions about not thinking of specific words of emotions as he was fearful they would contaminate his life and family with danger, this contamination fear was also accompanied by specific repetitive checking behaviours in the home. John was married, had an adolescent son with ADHD style symptoms whom he struggled with and found to be very defiant. He described his

wife as a good woman but anxious, insecure and depressed, and two young twin daughters which he said were doing just fine right now, but was worried that they could become anxious in the future. He barely slept and was constantly obsessing about being a failure or losing control. He was severely disappointed in himself and seemed obsessed with not turning into his parents, both of who he felt had failed in life due to not having a plan for it. He was equally disappointed in his wife and son, and worried that they did not appreciate the need for a serious plan for life either. He had been previously using anxiolytics, antidepressants and, on and off over the years, but had decided to stop all these medications as the improvements from these were marginal in his view. Whilst he seemed both anxious and dysthymic at times, he had excessive energy and strategies in his mind to control all the dangers and turn life into a success. His mind constantly appeared to be hyper-aroused, so was his body. Upon formal psychometric testing, John met both the for GAD through a high score of 80 % for anxiety symptoms prevalence, as well as a depression diagnosis through the prevalence of 50% for depression symptoms, however the prevalence of anxiety symptoms was comparatively much higher than the depression symptoms, and seemed secondary in nature, or potentially a form of learned helplessness rather than unipolar depression or dysthymia. In addition, he had a prevalence rate of 60% for OCD symptoms upon testing, and thereby presented as a complex pathology in terms of affect, arousal and associated schemata.

Listening to John's narrative about himself, his life and his family, it soon became clear to me that something that connected him, his wife and his son profoundly was a state of anxiety, undercurrent rage and defiance. It was like a meta-affective narrative within the family. I decided to invite each of them for an individual assessment with a view to conducting a systemic ReAttach intervention with the whole family. Upon further questioning, it became clear that each of them felt both profoundly disappointed, anxious and angry at the same time, however each of them dealt with their specific fear of disappointment schema in different ways, or different coping styles as per schema therapy theory. John was constantly trying to get his son and wife aim for perfection in an effort to avoid his own fear of failure. Both his wife and his son perceived this as an act of aggression and dismissal of their needs, and were thereby disappointed with him, while equally being afraid of him and angry with him. John was trying to control his fear via over-compensation and hypervigilance with himself and those around him. His wife Jane had a history of fearing disappointing men, and had experienced most men as dismissive and controlling of her, and angry towards her. Her coping style was collapsing into that fear and becoming small and helpless, which in turn would reinforce John's fear of her having no plan and being disappointed. With both parents being preoccupied by their fears, by dad trying to over-control by controlling others, and mum caving into it by

being insecure and sad, their son Luke had experienced both of them as emotionally unavailable and dismissive of his feelings and needs. He seemed profoundly sad and mentally isolated, however had no capacity to mentalise his feelings in order to understand and process them, and had developed symptoms which would have partially fit Oppositional Defiant Disorder (ODD) or Attention Deficit Disorder (ADD). He seemed invested in avoiding his pain by creating situations that made both his parents feel powerlessness, angry and sad at the same time. In a very convoluted manner, he had developed his own way of getting them to hold him in mind by them being afraid of his next moves and feeling out of control with him.

The sum of these phenomena, which seemed like a perfect storm, was that each of them was constantly hypervigilant towards the other, each of them felt constantly disappointed by the others, and each of them constantly had their schema reinforced: John felt like he had lost control, Jane felt alone, helpless and a disappointment, and Luke felt anxious and angry, punished and never listened to. Both men seemed slightly autistic as in they appeared to be trying to control complex emotions via controlling their immediate environment with force, while mum often felt like a leaf in the wind, blown from one end to the other. I felt quite confident that this triangulation of fear, rage and hypervigilance would go on forever if they were left to continue using the coping styles they had used thus far. Indeed, upon questioning it had gone on for many years and had slowly but continually worsened, to an extent where feeling contempt for each other had started. They were all oscillating between hyperthymic and dysthymic mood states, struggling to feel euthymic at all most of the time.

Based on the urgency of things needing to change before contempt could destroy the family, I decided to treat each individually with 3 ReAttach sessions before we got to direct family work with everyone in the room. I decided the following protocols:

John: needed to process and de-alarm his disappointing relationships and identification with mum and dad (optimal arousal), his wife and son, reduce black and white thinking around success and failure (low arousal), understand his own rage (low arousal), accept 'good enough', and learn to not be afraid of feelings of others and connect to them (low arousal).

Jane: needed to process and de-alarm her relationship history with men (optimal arousal), her husband and son, reduce black-and-white thinking around herself being disappointing (low arousal), learn to mentalise grief (low arousal), accept pain in others, and learn to not be afraid of feelings of others and connect to them (low arousal).

Luke: needed to process his parental relationships, which he had

experienced as disconnected and dismissive (optimal arousal), authority figures (teachers), reduce black-and-white thinking around connectivity, learn to mentalise both sadness and rage in a way that allows talking about it rather than detaching or being destructive, and learn to not be afraid of feelings of others and connect to them (all in low arousal).

These protocols were implemented into 3 ReAttach sessions each, and much to my relief the family dynamic started changing in a way whereby everyone started to feel that their feelings were manageable, could co-exist and be talked about in a helpful manner. We then had the first family session where everyone was allow to say to the others what made them feel closer to them, and what made them feel distant. With each of the three having built up the capacity to listen to the feelings of the other without going into hypervigilance, this led to constructive family dialogue, up to a point where they could make plans together, much to John's delight. Now, making plans made everyone feel competent and connected, and it could be done playfully. John had to remain aware of not rushing ahead too much, as this ran the risk of dismissing the needs of others and resetting old patterns. All three had been tracked on mood scales throughout, and indeed in all three, scores for hypervigilance as well as dysthymic mood states reduced. The twins are still doing fine was the last I heard when we decided to cease the sessions and arrange a 12-month follow up session in a year's time.

1.4. Conclusion

The above very brief case study probably best demonstrates how ReAttach allows to move on from a pathology based approach, to simply systemically assess arousal and multi-sensory processing problems in an effort to foster cohesion and collective multi-sensory processing, both within individuals as well as families, from micro-system to macro-system. As evident by the symptom prevalence, a contemporary individualistic ontology would have either only treated John for OCD and GAD with pre-morbid depressive symptomology, or all three individuals on their own, thereby John for OCD/GAD, Jane for GAD with depressive co-morbidity and Luke for ODD or ADD, with depressive co-morbidity. However, assessing from a systemic symptom network perspective, we have managed to utilise ReAttach to formulate three different forms of hypervigilance reinforcing each other, with each of them being a different coping style to very similar schemata and undercurrent threat-based affects. This allowed for a clear therapy plan for each of them which in turn reduced the hypervigilance in each of the three, increased multi-sensory processing in each of the three family members, and brought more cohesion to each of them. More importantly, this phenomenon was mirrored within the

family system, where we could also observe decreased hypervigilance and dysthymia, increased connectivity, improved attachments, increased family cohesion and successful collective multi-sensory processing, in other words, functional relating and communication both on verbal, non-verbal, affect and arousal channels. Similar therapy protocols can be adapted for Borderline Personality Disorder symptoms, Bipolar symptoms, Autistic symptoms, to name but a few. The options are rather unlimited so long as one can assess how specific schemata cause affect, arousal and sensory dysregulation in an individual, and how this in turn resonates or colludes with the other members of a family or system, depending on their unique symptom network or dysregulation.

Returning to the original endeavour of this chapter, which was a focus of indications of ReAttach within other models of therapies, usually designed for specific presentations, it is suggested that ReAttach, when factoring in all its possible interventions, brings a vast amount of core interventions that are often individually represented in pre-existing modalities of therapy. They can be found in psychoanalysis and mentalisation based therapy, in terms of working with defences such as projections and splitting, attachment and relationship problems, in Cognitive Behaviour therapy in terms of cognitive bias and behaviour modification. Further trauma interventions can be traced back to CBT, EMDR, narrative and systemic therapies, to name but a few. The processing of social concepts relates to both family and constellations therapies. Many of them already currently come together in Schema Focussed Therapy, which has often been described as a third wave CBT approach, however Schema Focussed Therapy (SFT) already states its origins to be in attachment theory, the object relations school of psycho-analysis and CBT. The elements of active arousal and affect regulation can be traced back to psychotropic medication, Emotional Freedom Technique interventions (EFT), EMDR, Emotion Focused Therapy, to name but a few. The empathic resonance between therapist and patient certainly corresponds to Roger's core condition of empathy. The scope of this chapter is too small to map out all of the overlap between ReAttach and pre-existing therapy models, and thereby the above list is only meant to be an introduction into this topic.

When focussing away from models per se, by focussing in on the specifics of what models of therapy actually achieve in terms of reducing pathology (reducing symptoms) and increasing health (salutogenic impact), we can start to generate a list of both *symptom-reducing* and health or cohesion *promoting factors*. The below table aims to illustrate what ReAttach can do, both as per current evidence base and in term of conceptualising what these changes may be about. We can therefore look at a list that demonstrates both its salutogenic health-promoting factors, but equally the symptom reduction capacity, for these reasons the list has highlighted the properties believed to be salutogenic. In addition, the

list demonstrates how both these variables, *symptom-reducing* and *health-promoting*, corresponds to contemporary presentations of developmental and mental health problems. This in turn demonstrates the vast potential of adjusting ReAttach therapy to most clinical presentations currently conceived of as discrete pathologies:

Table1.1. *ReAttach Therapy Options – Salutogenic and Symptom Reduction*

ReAttach Therapy Options	Salutogenic	Symptom Reduction: Network Correspondence
Enhancing Attachment Constellation	•	Relationship Problems, Personality Disorders, Conduct Disorders, ASD
Anxiety / Hypervigilance Regulation	•	GAD, OCD, Paranoia, Personality Disorders, Hypomania
Depression / Dysthymia Regulation	•	Depression, Bipolar Affective Disorder, Borderline Presentations, ADD presentations,
Increased Empathy / Compassion	•	Interpersonal Problems, Family / Systemic Problems
Theory of Mind Enhancement	•	ASD, ADD, Personality Problems, Conduct Disorders
Multi-Sensory Integration	•	ADD, ASD, OCD, GAD, Personality Problems
Mentalisation Increase	•	ASD, ADD, Personality Disorders, Dementia
Individual Coherence Fostering	•	Developmental Arrest, Psychosis, OCD
Systemic / Group Coherence Fostering	•	Interpersonal problems, Systemic Pathologies, Addictions
Transgenerational Work	•	PTSD, Trauma, Family Problems
Increased Self Soothing	•	Trauma, Addictions, Hypomania
Re-Narrating Life	•	PTSD and Developmental Trauma
Increased Affect Regulation	•	GAD, OCD, BPAD, Personality Problems, ADD, Hypomania
Increased Intuition/ Sensing	•	ASD, Relational Problems, ADHD, Dementia
Increased emotional awareness / literacy	•	ADD, ASD, OCD, GAD, Personality Problems, Hypomania, Alexithymia
Fragmentation / Dissociation Interventions	•	Dissociative Disorders, Personality Problems, Hypomania, Dementia

Table1.1. *Continue*

Differentiating Cluster Emotions and Cognitions	•	ADD, ASD, OCD, GAD, Personality Problems
Acquisition of new skills, cognitive and affective	•	ADD, ASD, OCD, GAD, Personality Problems, Dementia
Repetition-compulsions interventions		OCD, Neurosis, Health Anxiety, Hypomania
Obsessions Interventions		OCD, Addictions, Hypervigilance, Health Anxiety
Working with Phobia		OCD, GAD, Trauma
Reducing Projections		Interpersonal and Systemic Problems, Personality Disorders
Reducing Projective Identification		Interpersonal and Systemic Problems, Personality Disorders
Working with Transference		Interpersonal and Systemic Problems, Personality Disorders
'Splitting' Reduction		Interpersonal and Systemic Problems, Personality Disorders
Trauma Interventions / Reductions		PTSD, Developmental Trauma
Cognitive Bias Modification		GAD, OCD, Depression, Personality Problems
Schema Focus		Gad, OCD, Depression, Interpersonal problems, Personality Problems
Coping Style Focus		GAD, OCD, Depression, Personality Problems
Somatic Problems Reduction		Conversion Disorders / Phenomena, Psychogenic Sexual Problems, Neuro Degeneration
Behaviour Modification		Conduct Disorders, OCD, GAD, Depression

This list is certainly not inclusive of all therapeutic variables nor all clinical presentations, but rather an initial introduction to thinking in terms of linking therapeutic variables to networks of symptoms, which is what ReAttach seeks to achieve. The emerging evidence from trials on the Reattach method, using pre- and post-measures for symptom prevalence rates, suggests that ReAttach has vast implications for working with various pathologies, especially if a clinician can think about presentations from a symptom-network perspective. It can further be integrated into existing talking therapies, and can therefore be used as a complimentary intervention as well as a stand-alone model. The wider implications are

therefore an attempt to move away from treating discrete pathologies with discrete interventions, but rather moving toward a salutogenic model that aims at understanding the inter-relation of all symptoms in a network, and promotes therapy that fosters coherence within humans and their relations, which corresponds to Antonovsky's model of salutogenesis, the origin of health. Additionally, the model implies a much needed shift away from a nuclear/individualistic understanding of humans and their predicaments, to a relational positioning of ontology that fosters in and embraces the universal connectedness of human experience and sensory processing, as current research continues to evidence that both our CNS and PNS are relational both in their set-up and functioning.

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Chapter 2

Oxytocin and autism spectrum disorder

Donatella Marazziti, Federico Mucci

Abstract

Oxytocin (OT) is a neurohypophysial hormone synthesized in the paraventricular and supraoptic nuclei of the hypothalamus. Although OT-like substances have been identified in all vertebrates, OT has been found only in mammals where it plays a major role in the onset and maintaining of behaviours typical of these animals, such as labour and lactation. Recently, several data have suggested the involvement of OT in the formation of infant attachment, maternal behaviour, pair bonding and, more generally, in linking social signals with cognition, behaviours and reward.

Not surprisingly, OT is hypothesized to be involved in the pathophysiology of some neuropsychiatric disorders, including obsessive-compulsive disorder, eating disorders, addiction, depression, anxiety disorders, schizophrenia, post-traumatic stress disorder and Prader-Willy syndrome, but mainly autism spectrum disorders. In this paper the most relevant findings reporting abnormalities of OT system in autism spectrum disorders will be reviewed with a particular focus on the possible therapeutic implications.

Introduction

Oxytocin (OT), a very abundant nonapeptide, is constituted by a cyclic part of six-amino acid with a disulfide bridge between Cys 1 and 6 and a three-residue tail alfa-amidated at the COOH-terminal. The evidence that all vertebrates possess at least a OT-like and a AVP-like peptide suggested the existence of two evolutionary molecular lineages: the isotocin-mesotocin-OT line, implicated in reproductive functions, and the vasotocin-vasopressin line, involved in the water homeostasis. On the contrary, OT and AVP, that differ from each other in terms of two amino acids (Ile vs Phe at position 3 and Leu vs Arg at position 8, respectively),

have been found only in mammals and probably have developed in parallel with typical mammalian behaviors, such as uterine contraction during labour and milk ejection essential for lactation.

OT and AVP are mainly synthesized in the magnocellular neurons of the SON and paraventricular (PVN) nuclei of the hypothalamus. During the intravescicular post-translational processing, OT precursor undergoes sequential proteolytic cleavage and other enzimatic modifications, such as glycosylation, phosphorylation, acetylation and amidation that lead to the three final products: OT, neurophysin and a carboxy-terminal glycoprotein. During this complex maturation process, OT is targeted along the axon to the posterior pituitary (Arvan and Castle 1998). Within the neurohypophysis each axon produces several nerve terminals that constitute about 50% of the total volume of the neural lobe. Once activated, magnocellular neurons release into the blood OT and its transporting proteins, so that they can elicit their effects on receptors located in distant target organs, such as mammary gland and kidney.

Besides the posterior pituitary, oxytonergic magnocellular axons reach also the arcuate nucleus, the lateral septum, the medial amygdaloid nucleus and the median eminence (Pittman et al. 1981). In the magnocellular SON and PVN nuclei, OT is also locally released from dendrites acting as self-modulators: the intranuclear release is fundamental for the synchronization of the depolarization of OT neurons during lactation, or for the positive feed-back on OT dendritic release in the SON during parturition (Neumann et al. 1996).

Hypothalamic OT can also reach the anterior pituitary through the hypothalamic-pituitary portal vascular system; at this level, OT might influence anterior pituitary hormones, while acting as a regulating factor, in particular prolactin, adrenocorticotropic hormone (ACTH) and gonadotropins.

The endocrine response to stress is mediated by the activation of the hypothalamic-pituitary-adrenal axis, such as corticotropin-releasing hormone (CRH) and AVP stimulate ACTH secretion from the anterior pituitary. In rats, OT has been demonstrated to potentiate the release of ACTH induced by CRH: in fact, if CRH is responsible for the immediate secretion of ACTH following an acute stress, when CRH levels begin to decrease during prolonged stress, the persistent level of OT in the median eminence seems to be related to the delayed ACTH response and the generation of ACTH pulsatile secretory bursts (Boyle et al. 1997). On the contrary, in humans, OT infusion inhibited the plasma ACTH responses to CRH, and suckling and breast stimulation increased and decreased, respectively, plasma OT and ACTH levels; these evidences would indicate an inhibitory influence of OT on ACTH secretion. Luteinizing hormone (LH) secretion from the adenohypophysis is primarily regulated by the gonadotropin-releasing hormone (GnRH). OT has been demonstrated to stimulate LH release: its administration to proestrous rats can advance

the LH surge with an earlier ovulation. Moreover, OT seems to sensitize the pituitary before full GnRH stimulation: in women, pre-ovulatory OT administration leads to the onset of the mid-cycle LH surge (Hull et al. 1995). Overall, the physiological relationships between OT and LH has yet to be clarified (Evans 1996).

OT neurons are also localized in the dorsal-caudal part of PVN and are called parvicellular given their smaller size, as compared with that of the magnocellular neurons. Their axons are part of the descending tract directed to the sympathetic centers of the spinal cord and to the parasympathetic caudal autonomic centers, including the dorsal motor nucleus of the nervus vagus and the nucleus of tractus solitarii (Amico et al. 1990, Palkovits et al. 1999). A peripheral synthesis of OT has also been demonstrated in placenta, uterus, corpus luteum, amnion, testis and heart.

Oxytocin receptors

A single population of OT receptors has been identified in both the brain and peripheral organs (Gimpl and Fahrenholz 2001). They belong to the class I of G protein-coupled receptor family and are primarily coupled to phospholipase C-beta that, once activated, leads to the generation of 1,2-diacyl-glycerol and inositol trisphosphate. These latter, in turn, promote the Ca2+ release from the intracellular storages and the activation of the protein kinase of type C with a final increase of intracellular Ca2+ that may trigger several cellular events, such as smooth cell contraction, changes of cellular excitability, modifications of gene trascription and protein synthesis. Progesterone has been demonstrated to bind and inhibit OT receptors in the rat, and in humans, too, a progesterone metabolite, the 5 beta-pregnane-3,20-dione, seems to act as a negative allosteric modulator, while cholesterol and Mg2+ or Mn2+ would function as positive ones.

The brain distribution of OT receptors shows a wide interspecies variability. In the rat, they are present in the olfactory system, basal ganglia, thalamus, lymbic system (bed nucleus of the stria terminalis, central amygdaloid nucleus, ventral subiculum), hypothalamus (ventromedial nucleus), brain stem and spinal cord with age-related changes in their density. In the rabbit, no receptor has been found in the ventral subiculum of the hippocampus or in the hypothalamic ventromedial nucleus. In humans, OT binding sites have been mainly found in the pars compacta of substantia nigra and globus pallidus, as well as in the anterior cingulate and medial insula (Brown et al. 2005). Theoretically, the different distribution of OT and OT receptors throughout the brain within each species might be related to the variety of functions potentially regulated by them, but attempts to relate anatomy to function are still inconclusive.

Oxytocin and social behavior

A growing body of evidence implicates OT in mediation of complex social behaviors. Indeed, in highly social species, OT has been shown to increase social approach behavior and pair bonding by reducing behavioral and neuroendocrine responses to social stress and is also suggested to mediate the rewarding aspects of attachment.

In mammals, the development of parent-child attachment is critical for the survival of the infant and the establishment of a solid relationship will continue to provide regulatory emotional functions throughout adulthood. Studies with non-human animals have previously demonstrated that as OT levels rise, animals increase their positive social interactions: they form social bonds, display selective infant–parent attachments, and form memories of these social interactions. The mother-infant interaction and other aspects of the early post-natal period may have profound and long-lasting behavioral and neurobiological effects. Early life experiences may alter response of adult neurogenesis to stress and persistent changes in the CRF systems due to early life stress have been demontrated (Heim et al. 1997, Mirescu et al. 2004). OT may be a candidate substrate for the transduction of early experiences into both short-term and long-term behavioral changes and other consequences, ranging from brain growth to later stress reactivity to ovarian disorders (Carter 2003). In humans there are evidence that the OT system is affected by early social experience. The failure to receive species-typical care disrupts the normal development of the OT and AVP systems in young children, while perturbations in these systems seem to interfere with the calming and comforting effects that typically emerge between young children and familiar adults who provide care and protection (Fries et al. 2005). Indeed, OT and AVP levels are increased by socially pleasant sensory experiences, such as comforting touches and smells. In a recent study, OT cerebrospinal fluid (CSF) concentrations were measured in 22 healthy women. Exposure to maltreatment, in particular to emotional abuse, was associated with decreased CSF OT concentrations. The number, severity and duration of the abuse, as well as current anxiety ratings, were inversely related to CSF OT concentrations, while suggesting that alterations in the OT system may be involved in the adverse outcomes of childhood trauma (Heim et al. 2009). Furthermore, the neuroendocrine responses to intranasal OT administration in men with early parental separation (EPS) resulted in attenuated cortisol decreases, as compared to non-EPS control subjects, while indicating the presence of altered central sensitivity to the effects of OT after EPS (Meinlschmidt and Heim 2007).

As far as parental attachment is considered, the laboratory rat has been an ideal subject for studies of maternal care (Numan 1994). Unlike many mammals, nulliparous female rats show little interest in infants

of their own species and when presented with foster young will either avoid or cannibalize them. At parturition, however, a dramatic shift in motivation occurs and maternal behaviors such as nest building and retrieval of pups became established. Pedersen and Prange (1979) first demonstrated that injection of OT into the lateral ventricles of nulliparous ovariectomized rats induces maternal behavior. Perhaps even more remarkable, blockade of OT neurotransmission by means of central injection of an antagonist or by lesions of OT-producing cells in the hypothalamus results in a significant inhibition of maternal behaviour. These various interventions appear to inhibit the onset but not the maintenance of maternal behaviour: when the females become maternal, an OT antagonist had no effect (Skutella et al. 1993). The rapid onset of maternal behavior in response to OT has been confirmed in several studies. However, it is important to note that OT is effective only to initiate the maternal behavior, but not for the performance of maternal behavior per se. Therefore, when the females become maternal, an OT antagonist had no effect. In humans, OT-related maternal behaviors have not been the subject of any systematic studies so far. In some reports it was shown that breast-feeding within 1 h of birth, when OT levels are very high, supports a long-lasting mother-infant bond and has a beneficial effect on the development of the child (Kennell et al. 1974).

The development of adult-adult pair bonds is certainly the least studied form of attachment from a neurobiological perspective. The relative paucity of studies can be attributed to the absence of pair bonds in commonly used laboratory animals, such as rats and mice. Prairie (Microtus Ochrogaster) and montane voles (Microtus Montanus) provide an intriguing natural experiment for studying the neural substrates of pair bonding (Insel 1997): in facts, montane vole looks remarkably similar to the prairie vole and shares many features of its non-social behaviors but differs consistently on measures of social behavior. The prairie vole is a mousesized rodent that is usually found in multigenerational family groups with a single breeding pair (Carter et al. 1995). They manifest the classic features of monogamy: a breeding pair shares the same nest and territory where they are in frequent contact, males participate in parental care, and intruders of either sex are rejected. On the contrary montane voles are generally found in isolated burrows, show little interest in social contact, and are clearly not monogamous. A lot of studies have investigated if those species differ for central pathways for OT. In fact, the species differ in the neural distribution of receptors for both peptides as much as they differ in behavior (Insel 1992a) and the receptors are expressed within entirely different pathways. In the prairie vole, OT receptors are found in brain regions associated with reward (the nucleus accumbens and prelimbic cortex), suggesting that OT might have reinforcing properties selectively in this species. Conversely,

receptors in the lateral septum, found only in the montane vole, might be responsible for the effects of OT on self-grooming, an effect that is observed in the montane vole but not the prairie vole. To date only one study investigated the role of OT on behavior and physiology in human couple interaction. In this double-blind placebo-controlled study 47 heterosexual couples received OT or placebo intranasally before a standard instructed couple conflict discussion. During the couple conflict OT administration was significantly associated to an increase of positive communication behavior in relation to negative behavior. After the conflict, subjects treated with OT showed a reduction of salivary cortisol levels compared to those treated with placebo. These results would support the hypothesis that also in humans OT would play a critical role in couple interaction and in the development of adult-adult pair bonds (Ditzen et al. 2009).

Again, in one of our previous study, we mesaured statistically significant and positive correlation between OT plasma levels and the anxiety scale of the ECR, a self-report questionnaire measuring adult romantic attachment, showing that the higher the OT levels, the higher the anxiety levels (Marazziti et al. 2006). The link between anxiety and oxytocin is therefore supported by our additional observation that those subjects with a preoccupied style of attachment, characterized by a high score of the anxiety scale of the ECR, were those exhibiting a trend towards higher levels of oxytocin, as compared with the remaining individuals with other styles of attachment. Pur findings represent one of the first reports of a direct link between oxytocin and that state of anxiety which is associated with romantic attachment in humans. In any case, it is not possible to conclude from our data whether the OT levels are a consequence or a cause of the anxiety measured by the appropriate scale of the ECR. In agreement with the majority of the above-mentioned findings, we would tentatively hypothesize that the positive relationship between OT levels and anxiety might be interpreted as a compensatory mechanism to hamper or counteract anxiety, at least that related to, or underlying, a romantic attachment. Since a moderate level of stress seems to promote pair bondings in different species, including human beings, OT might be considered a real "pro-social" hormone (Chiodera et al. 1991). Consistent with this theory, the evidence that in animals at high doses oxytocin promotes the ACTH release (Scantaburlo et al. 2001), while in humans both incresaed and decreased ACTH activity have been reported (Altemus et al. 1995, Legros 2001). However, basal oxytocin levels have been reported to correlate with measures of anxiety, aggression, guilt and suspicion (Uvnås-Moberg et al. 1991), and noise stress to provoke the release of the neuropeptide in high emotionality women (Sanders et al. 1991). Again, the link between anxiety and OT might be restricted only to that anxiety present in romantic relationships which is strongly related to the fear to be abandoned (Simpson and

Rhole 1994). Pursuing this line of thought, romantic relationships could be interpreted as chronic stress conditions, with OT possibly playing a role in maintaining anxiety at the levels required for the development of strategies and behaviours best suited to resulting in a partner's continued proximity in the first stages of the romance, and to keep his/her closeness subsequently. In this sense, OT might be perhaps considered an essential element for obtaining the rewarding effects of a romantic relationships, as a result of its increasing a prospective sexual partner's willingness to accept the risks deriving from social contacts (Kosfeld et al. 2005), through the dampening of anxiety mechanisms. Of course, with particularly vulnerable individuals, if excessively affected by the relationship itself or by other events, this might induce them to become too anxious and thus to cross the line between normality and pathology to the point of developing a full-blown psychiatric disorder. This presumably would be an acceptable risk, in evolutionary terms, in order to ensure the higher likelihood within the species of bonding and faithfulness to a productive relationship (Leckman et al. 1999).

Oxytocin and autism spectrum disorders (ASD)

Several psychiatric disorders are strongly influenced by social variables, including panic disorder, social anxiety disorder (SAD), obsessive-compulsive disorder (OCD), depression, eating disorders and ASD, seem to have a close connection with the brain circuits that underlie social emotions, such as the OT system. In the following section the most relevant evidence linking the OT system to pathophysiology or symptoms or dimensions of ASD will be reviewed.

Autism spectrum disorders (ASD) encompass a series of neurodevelopmental disorders characterized by impairment in three behavioral domains including social interactions, language, communication and imaginative play, along with restricted and repetitive activities and interests (Muhle et al. 2004). The three main forms of ASD are autism, Asperger syndrome and pervasive developmental disorder not otherwise specified, sometimes called atypical autism. Although ASD are quite common while affecting 1% of the general population, no clear medications or standardized treatment is available for its main symptoms. Generally, the main therapeutic strategy is complex and based on both psychotherapeutic and pharmacological interventions. Similarly, the pathophysiology of ASD is still largely unknown and considered to be multifactorial depending perhaps on a genetic susceptibility leading to the disorder through the interplay of environmental/contextual triggered and epigenetic mechanisms.

As already shown, OT and AVP seem to be implicated in social skills (Wakerley and Lincoln 1973, Carmichael et al. 1987, Carter 1992, Insel 1992a, Panskepp 1992) and abnormalities of their neural pathways have

been proposed to underlie several aspects of ASD including repetitive behaviors, cognitive and social deficits, early onset, and genetic loading (Insel et al. 1999, Insel and Young 2001). It has also been proposed that the central regulation and expression of OT and AVP may contribute to explain the higher prevalence of the disorder in male subjects. In fact, centrally active AVP has been related to increased vigilance, anxiety, arousal and activation, while OT seems to have opposite effects including reduced anxiety, relaxation, growth and restoration. On one hand, higher activity of AVP, due to an increased exposure to androgens, could contribute to the male vulnerability to ASD, on the other hand, OT, which is estrogen-dependent and is higher in female subjects, especially during early development, may be protective (Carter 2007). Animal models and linkage data from the genome screen in humans indicate that the OT receptor gene may be an excellent candidate for the susceptibility to ASD (Insel et al. 1999, Young 2001, Young et al. 2002, Ylisaukko-oja et al. 2006). Two specific nucleotide polymorphisms of OT receptors, rs2254298 and rs53576, have been found in a significant higher rate of autistic subjects than healthy individuals in a chinese han population (Wu et al. 2005); the association has been replicated in a caucasian sample from United States, but only for the rs2254298 polymorphism (Jacob et al. 2007). After these preliminary evidence, other association studies have confirmed that specific haplotypes in the OT receptor gene may confer the risk to develop ASD, and a link with communication, daily living skills and socialization has also been reported (Lerer et al. 2008). In the third association study, 152 ASD subjects from 133 families were genotyped and tested for association using all 18 tagged single nucleotide polymorphisms (SNPs) across the entire OXTR gene region identified using HapMap data and the Haploview algorithm. Significant association with single SNPs and haplotypes were observed with ASD. In particular, a five-locus haplotype block (rs237897-rs13316193-rs237889-rs2254298-rs2268494) was significantly associated with ASD (Lerer et al. 2008). In a following study, family-based single-marker and haplotype association analyses with 22 SNPs in the OT receptor and its 5' region were performed in 100 families with autistic disorders on high-functioning level, including Asperger syndrome, high-functioning autism, and atypical autism. Significant associations with autism were found for one single SNP and one haplotype. Furthermore, ASD patients carrying the haplotype associated with autism showed significant impairments in comparison to noncarriers of the haplotype in social interaction and communication (Wermter et al. 2009). In a more recent association study carried out in a Japanese population, the associations between OT receptor gene and ASD were performed by analyzing 11 SNPs using both family-based association test and population-based case-control test. Although no significant signal was found in the family-based association test, significant differences were observed between patients and control subjects in allelic frequencies of

four SNPs, including rs2254298. In addition, haplotype analysis exhibits a significant association between a five-SNP haplotype and ASD, including rs22542898 (Liu et al. 2010). All these data seem to support that OT receptor gene may play a significant role in conferring the risk of ASD. Interestingly, in a recent study the epigenetic regulation of OT receptor gene has been implicated in the development of the disorder for the first time (Gregory et al. 2009): indeed, a genomic deletion containing the OT receptor gene previously implicated in autism was present in an autism proband and his mother. However, the proband's affected sibling did not harbor this deletion, but exhibited epigenetic misregulation of this gene through aberrant gene silencing by DNA methylation. Moreover, decreased plasma OT levels have been reported in 29 autistic children, as compared with age-matched healthy control individuals and lower OT levels were associated to lower scores on social and developmental measures (Modahl et al. 1998). An altered, extended form of OT, which is normally detected only during the fetal life has been found in the blood of autistic children at higher levels than normal subjects (Green et al. 2001); this fetal form of OT is considered to be less active than the adult OT and may interfere with the functioning of the OT system. It is possible that different genetic expression of OT or the enzyme implicated in its synthesis may be involved in the pathophysiology of autism and related disorders.

Another research line linking OT to ASD is focused on the crucial role of the autonomic nervous system, as behavioural and physiological findings show that autistic individuals have great difficulty in recruiting the neural circuits regulating the social engagement processes. Indeed, autism seems to be associated with autonomic states diverging subjects from social contact towards defensive strategies, such as fight/flight behaviours or shutdown. This is supported by the decreased use of the face and head muscles, with limited facial and gesture expressions, or to disentangle the human voice from the context. This is mainly due to a dysregulation of the vagus, involved in several feedback pathways from and to periphery and CNS, that in turn would lead to alterations at different levels, such as gut, heart, pancreas, HPA axis, and also higher neural processes. OT would be involved in the communication between the hypothalamus, amygdala, paraventricular nucleus and the dorsal motor nucleus of the vagus to elicit positive visceral feelings related to proximity with another individual, which is impaired in ASD (Porges 2011).

Other evidence of the possible involvement of OT in autism is that OT infusion was shown to reduce repetitive behaviors in patients with ASD, as compared with placebo infusion (Hollander et al. 2003, 2007). In a double-blind, randomized, placebo-controlled, crossover design study OT nasal spray or a placebo were administered to 16 male ASD youth. In comparison with placebo, OT administration improved performance

on the Reading the Mind in the Eyes Task. This is the first evidence that OT nasal spray improves emotion recognition in ASD young people, while suggesting its potential role in the early treatment of ASD patients (Guastella et al. 2009). Subsequent studies underlined that intranasal OT strengthened interaction with a partner in adult ASD patients (Andari et al. 2010), enhanced gaze to eyes (Auyeung et al. 2015) or attention to faces (Kanat et al. 2017). These clinical effects have been substantiated by some imaging data reporting how OT might improve facial and social emotion recognitions (Domes et al. 2014, Aoki et al. 2015).

In any case, a lot of work remains to be done in terms of possible routinary use of OT in ASD subjects, even because long-term studies are really a few and results inconsistent (Yamasue and Domes 2017).

Conclusion

OT and the OT system are currently attracting an increasing interest and have become one of the main topics of several research lines. Different data in both animals and humans suggest that OT plays a major role in the modulation of a broad range of functions, such as delivery and lactation, and of complex behaviors including memory, positive social bondings and stress decrease. Not surprisingly, OT has been implicated in the pathophysiology of different neuropsychiatric disorders including ASD, however data are scattered and the abnormalities described in the patients are quite meagre and, therefore, should be considered preliminary. This is also due to the fact that research in this area is strongly limited by the lack of reliable peripheral models of central OT to be used routinely in clinical samples. If substantiated by further data, however, the demonstration that OT abnormalities are implicated in the pathophysiology of ASD might open new horizons to novel and more "natural" treatment interventions.

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Chapter 3

ReAttach Therapy: a new hope in the treatment of anxiety disorders

Ashutosh Srivastava

Abstract

There appears to be a gap between research and real practice on talk based psychotherapies. This is because of subjectivity caused by the therapist leading to variability in expressions and sharing by the patient. This disconnect has several negative consequences, potentially including less-than-optimal practice standards as well as a lack of input from practicing psychotherapists on how research can be improved and made more relevant in their day-to-day clinical work. When it comes to treatment of anxiety disorders this becomes all the more difficult as the patient is preoccupied with his physical symptoms and finds it difficult to focus on his thoughts. ReAttach Therapy provides an opportunity to the psychotherapists to manage the disorders with anxiety by working on the information processing not on the content. The unpleasant state of inner turmoil and significant feelings of anxiety and fear goes down immediately by changing the cognitive biases associated with anxiety. Anxiety is caused by futuristic worry and fear in response to a current events. Such emotional and physical responses i.e. fast heart rate and shakiness subsides in the very first session of ReAttach therapy. ReAttach is found to be effective in almost all types of anxiety disorders including generalized anxiety disorder, specific phobia, social anxiety disorder, agoraphobia, panic disorder, and other disorders with anxiety as a primary symptom.

3.1. Introduction

Anxiety disorders affect nearly one billion people around the globe, and have become a very important area of research interest for mental health professionals (Eisenberg et al. 1998, Dopheide & Park 2002, WHO

2004). This group of disorders are among the most common mental, emotional, and behavioural problems (Kessler et al. 2005a, 2005b; Olatunji et al. 2007; Kessler & Wang 2008). People with anxiety disorders are treated and sometimes benefitted from psychological treatments, pharmacotherapy or a combination of the two. Common limitations of conventional antianxiety therapy include co-morbid psychiatric disorders and increase in dose of drugs leading to intolerable side effects. There appears to be a gap between research and real practice on traditional psychotherapies as well. This is because of subjectivity caused by the therapist leading to variability in expressions and sharing by the patient. This disconnect has several negative consequences, potentially including less-than-optimal practice standards as well as a lack of input from practicing psychotherapists on how research can be improved and made more relevant in their day-to-day clinical work. When it comes to treatment of anxiety disorders this becomes all the more difficult as the patient is preoccupied with his physical symptoms and finds it difficult to focus on his thoughts. ReAttach Therapy provides an opportunity to the psychotherapists to manage the disorders with anxiety by working on the information processing not on the content. This paper presents an overview of ReAttach therapy as an effective and safe therapy for anxiety disorders. ReAttach is a multimodal approach addressing multiple clinical factors in symptomatology networks of anxiety disorders (Weerkamp 2015). Although there are many differences in psychological functioning there are overlapping symptoms and cognitive processes of information, emotions and events. Starting point is the assumption that the key factors in cognitive processes are the same for all humans. The underlying structure of ReAttach is based on influencing these key factors simultaneously to facilitate optimal conditions for cognitive functioning and activation of potential development. ReAttach for anxiety disorders is thought to comprise the following components: arousal regulation, tactile stimuli and joint attention, multiple sensory integration processing, conceptualization and cognitive bias modification. These choices determine and limit the practical application of ReAttach. It will be very interesting to investigate the implication of these choices and to find out what we can learn from this.

Anxiety Disorders are a cluster of such conditions, and each with peculiar symptoms. The experience of anxiety typically has two primary components namely physical and emotional; leading to the impairment in cognitive processes of the individual (Cates et al. 1996, Charles & Shelton 2004, Augustin 2005, Shri 2006, Rang et al. 2007). However, all anxiety disorders have one thing in common: persistent, excessive fear or worry in situations that are not threatening. People can experience one or more of the following symptoms:

Physical Symptoms: Headache, nausea, vomiting, sweating, trembling,

stomach pain, ulcers, diarrhoea, tingling, weakness, body ache, feeling shortness of breath, hot flashes or chills, increased blood pressure and heart rate, etc.

Emotional Symptoms: Nervousness, worry, fear, irritability, insecurity, isolation from others, self-consciousness, desire to escape, feeling that one is going to die etc.

Cognitive Symptoms or impairment in: Thinking, decision-making ability, perceptions of the environment, learning, memory and concentration.

Such symptoms lead to an inadequate use of the personal resources and significant distress in individuals suffering from the disorder (Frost & Hartl 1996). Most of the Anxiety conditions are disabling and have a strong impact on the social, emotional, and the behavioral levels (Tolin et al. 2008). In addition, many environmental and health risks are associated with Anxiety Disorders are such as an increased risk of accident (Tolin et al. 2007).

Cognitive-behavioural therapy (CBT) applied to various anxiety subtypes has shown some success in treating individuals suffering from Anxiety (Frost et al. 2010). However, attrition rates are often high and a number of counterproductive thoughts and behaviours interfere with therapy, such as lack of motivation and not completing homework assignments and lead to treatment resistance (Frost et al. 2010, Pertusa et al. 2010). Medication and Lack of compliance with CBT exercises in fact predicts a weak treatment response in patients with anxiety disorders (Tolin et al. 2007). In many cases, the cause of noncompliance to treatment can be attributed to the individual's poor insight (Saxena et al. 2004) and to the ego-dystonic nature of symptoms (Frost et al. 2010).

Existing psychological treatments are based primarily on the Beck's (1996) CBT model. This involves a larger number of sessions, namely, around 15-20 therapy sessions are needed (Kaczkurkin & Foa 2015). In addition, the therapist works on four primary aspects: psychoeducation to explain the diagnosis and prognosis, improvement of decision making and organization, as well as cognitive restructuring (Frost et al. 2003). So far no randomized studies have been conducted to produce firm empirical evidence concerning efficacy of CBT therapy. There are notable differences between CBT and ReAttach in the treatment approach to anxiety. CBT generally focuses on background cognitive processes such as the appraisals of meaning given to thoughts of worry and cognitive challenges of personal beliefs about possibly threatening situations. ReAttach, in contrast, does not address appraisals or Beckian type of cognitive distortions because it locates the source of the anxiety in the primary cognitive biases driving the difficulty in getting rid of anxiety producing ideas. This cognitive bias is considered an assumption, not an intrusive thought.

In ReAttach, this cognitive bias is distinct from normal bias. A number of reasoning devices mislead the person to infer a bias that seems logical, where in fact, there is no reason to have biases. The reasoning devices include category errors, blending terms, and inverse inferences. Category errors involve confusing separate events or objects as if one is the same as the other, for example, "This event is like the one experience earlier, so I should avoid it," and "I heard of a man who face severe consequences in such situation, so this could be the case here with me as well". Blending terms occurs where two terms or activities with often opposing attributes become blended to represent the same construct. These reasoning devices are collectively termed/cognitive biases and the aim of ReAttach is to undo the cognitive biases and return the person to making decisions based on senses, common sense, and realistic needs and experiences. This resolution is accomplished through cognitive bias modifications where the person gains insight into the cognitively biased nature of the reasoning schemas and so, ceases to infer threat where, in reality, there is no real threat.

The initial bias is maintained by an idiosyncratic reasoning process leading to secondary inferences. Also, the schemas included unrelated stories about people who faced similar situations and later found that they has to experience severe consequences. The case studies presented here are of participants who received ReAttach therapy. Steps of the therapy are detailed as well as the progresses of therapy over sessions.

3.2. Theoretical and research basis for treatment

A fundamental aspect of human mind relates to the ability to momentarily shift attention from the immediate environment to an entirely imaginary situation that might happen in the future (D'Argembeau et al. 2008). People engage in future-oriented thought with a remarkably high occurrence in their daily life, that serves a number of significant functions, including facilitating numerous types of goal-directed behaviours, supporting visionary decision making and contributing to psychological well-being (Benoit et al. 2011, Crisp & Turner 2009). Excessively negative and unreasonable future thinking may lead to emotional arousal and anxiety disorders.

Arousal regulation

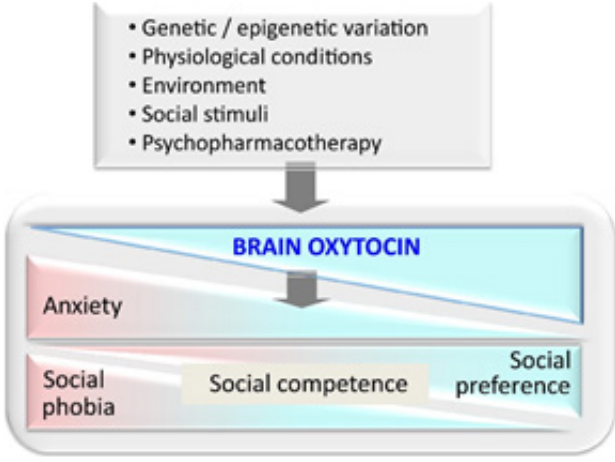
Arousal plays an important theoretical role in many behavioural categories such as, intense emotional experiences and expressions such as terror, rage, lust, and ecstasy (Blascovich & Tomaka 1996). ReAttach begins by optimization of arousal to a focused level of alertness. To reprocess information, the arousal level of the patient is regulated

slightly above the level of 'falling asleep' (Weerkamp 2015). This arousal shifting leads to deep relaxation, mental imagery, creativity, and learning by reprocessing the information in long-term memory. ReAttach uses the bipolar arousal shifting (namely high and low) in combination with the multimodal approach. High level of arousal is required to achieve an optimal information processing, good joint attention, active stimulation of multiple sensory integration and training social cognitive skills. While a meditative Trans like condition (extremely low arousal level) is needed to access an overlooked information that needs reprocessing and producing anxiety. Both these arousal levels are achieved by changing the speed of tapping at the dorsal side of the patients' hands.

Oxytocin and Joint Attention

Physical touch stimulates the brain to produce the Oxytocin (Gordon, 2013) and it is intricately involved in a broad array of neuropsychiatric functions, it decreases cortisol release and anxiety in response to social stress (Heinrichs et al. 2003). Although the effects of the neuropeptide Oxytocin are often described as activation of prosocial behaviour including trust, empathy, bonding and caregiving, depending on the context Oxytocin may also increase aggression (Neuman 2016). The effect of Oxytocin on our emotions is determined by environmental factors. Psychosocial stressors are found to increase Oxytocin levels (Misrani 2017, Hoge 2008). Low brain OXT activity, hypothesized to be associated with high anxiety levels (Neumann & Landgraf 2016).

Figure 3.1. *Oxytocin System*



See **figure 1.** The activity of the brain oxytocin (OXT) system is mainly reflected by the level of expression of OXT or its receptor, by local OXT release into and local OXT availability within the extracellular fluid, and by the OXT receptor binding capacity. Genetic and epigenetic factors, physiological conditions, such as reproduction or stress, as well as environmental and social stimuli significantly contribute to the individual expression and modulation of these parameters. Further, combined psycho-pharmaco-therapy with the aim to increase central oxytocin availability may shift the activity of the oxytocin system toward the right, which is likely to be accompanied by reduced anxiety and improved social competence (Neumann & Landgraf 2012).

This means that depending on environmental social factors Oxytocin will stimulate either bonding or pleasant feelings or induce triggers, projections and fear. Experimental research with mice has shown that this hormone plays an essential role in enhancing the memory of negative social interactions, increasing fear and anxiety for future stressful events (Koch 2016). Appraisal of a situation as negative or threatening activates the brain that intensifies the painful memories and causes the vulnerability to feeling fearful and anxious during stressful events. On the other hand Oxytocin intensifies positive social memories and thereby increases feelings of safety and comfort. In ReAttach Oxytocin production is stimulated by natural physical contact and tactile stimulation: tapping on the hands or knees. It is an easy and a culture friendly way to regulate emotions. The tapping helps the therapist and patients to achieve joint attention and slow down the thinking process leading to decrease stress. Joint attention is important to maximize the results of an intervention or cognitive training and considered to be a precursor of theory of mind (Gomez 1993) and language development (Verhulst 2008). In ReAttach, we simultaneously combine - external arousal regulation to gain, and maintain joint attention and Oxytocin, administered through physical contact, to improve the social reward system. We assumed that this process optimizes the conditions conducive to better processing of information and coping in individuals with anxiety. However, many individuals with Anxiety Disorders experience difficulties in accepting touch because of tactile defensiveness.

Multiple Sensory Stimulation and Processing

Every day we are overloaded with variety of information, which is used to successfully and effectively deal with our environment. Most of this information is specified by information carried by multiple senses but we perceive these as singular and unified (Krueger 2016). For patients of anxiety this system is not functioning properly. In general anxiety reflects an interaction between genetic vulnerability and early environment, while development of the specific anxieties reflects the nature of the

environmental risk (Eley & Stevenson 2000). Cognitive theory (Beck 1976, Williams et al. 1988, Williams et al. 1997) and empirical research have demonstrated the presence of cognitive or information processing biases towards threatening words and pictures in anxious adults and children (e.g., Mogg et al. 2000, Taghavi et al. 2000). These information processing biases are proposed to operate throughout several aspects of cognition and to cause (MacLeod et al. 2002) or maintain (Mogg & Bradley 1998) anxiety levels. In addition, it is proposed that biases associated with threat are specific to anxiety (Beck & Clark 1988). The systems in brain which processes this information are not activated or under activated to an extent that they create cognitive biases leading faulty processing of such information.

In ReAttach the default mode network (DMN) activates specific component processes which underlie more complex cognitive functions, such as episodic retrieval and future imagining and facilitates Cognitive Bias Modification (CBM) (Andrews-Hanna 2014, Weerkamp Bartholomeus 2015). The resting state brain networks, particularly the Default Mode Network (DMN), have been found to be altered in several psychopathological conditions such as depression and anxiety (Coutinho 2016)

With the help of multisensory information processing, spatially and temporally concordant, stimulation of auditory, visual, tactile and emotional input in optimal arousal and joint attention conditions ReAttach activates this system (Weerkamp Bartholomeus 2015). ReAttach starts the integration of the stimuli by activating conceptualization (Weerkamp Bartholomeus 2015). Multisensory (e.g., visual-auditory) stimuli that are spatially and temporally concordant tend to influence one another's processing, and may ultimately be integrated or bound, whereas those that are discordant in space and/or time tend to not influence the processing of one another (Conrey 2006).

Conceptualization

Cognitive appraisals play a vital role in the generation and regulation of affective states (Barrett 2006, Gross 2003). It is a common understanding that that the stress linked amplified physiological arousal results in poor health (Geronimus et al. 2006, Matthews et al. 2004, McEwen 2006). The arousal regulation model attempts to change the conceptualization of threat by demonstrating that arousal can be a resource which can enhance performance (Barrett 2006, Lindquist & Barrett 2008, Lindquist et al. 2011). Patients who reframed arousal as an adaptive coping strategy during acute anxiety, demonstrate improved physiological and cognitive outcomes (Jamieson et al. 2010,

Jamieson et al. 2012). Regulating stress arousal is hypothesized to improvise the appraisals of coping resources, which are predicted

to attenuate threat responses and promote a more adaptive profile of reactivity in anxious individuals.

Cognitive Bias Modification

Cognitive bias modification (CBM) has been defined as the 'direct manipulation of a target cognitive bias, by extended exposure to task contingencies that favour predetermined patterns of processing selectivity' (MacLeod & Mathews 2012). Cognitive bias modification (CBM) is an innovative approach to modifying cognitive biases that confer vulnerability to anxiety. CBM interventions are designed to directly modify attention and interpretation biases via repeated practice on cognitive tasks. Analogue studies have demonstrated that CBM affects cognitive biases and anxiety in a number of anxiety conditions.

Clinical anxiety disorders and elevated levels of anxiety vulnerability are characterized by cognitive biases, and this processing selectivity has been implicated in theoretical accounts of these conditions. A review of research that has sought to evaluate the causal contributions such biases make to anxiety dysfunction and to therapeutically alleviate anxiety using cognitive-bias modification (CBM) procedures (Beard 2011).

3.3. Introduction of 3 case studies

Case 1

Ms. A is a 22-year-old unmarried girl in the second year of her graduation from an upper middle class family. She was living in hostel. She visited the author with a complains of inability to sleep, inability to concentrate on thing, crying spells, worried about future, frequent headache and backache, and episodes of unconsciousness. She informed that she is experiencing this problem for past 2 years now and is not able to cope up with it. She has never consulted any therapist before her problem. However, she had tried several pharmacological treatments (e.g., Alprax and Clonazepam), which were not effective. She feared that her problem would become as severe as she would not be able to continue with her studies. All this started with her recent breakup with her boyfriend.

Case 2

Ms B is a 26-year-old sales girl, working in insurance sector, feels that she is 'going mad' with anxiety. B has no significant past medical or mental health history. On examination B describes feeling anxious

most of the time. The problem started when she was studying for her Graduation, when she describes being incapacitated with anxiety. Despite wanting to enter higher education by doing MBA she felt that she would be unable to cope with the pressure and left the idea. Her family was disappointed about this. B describes not being able to make decisions as she worries too much about what would happen if she made the wrong decision. She also describes a low mood but has no suicidal thoughts.

Case 3

Mr. C is a 29-year-old single man who has come to the author for consultation regarding feeling stressed and exhausted all of the time, sleeping badly, having frequent headaches and persistent worries about his work situation. Past history C describes himself as someone who has been 'easily stressed' all his life. He had seen a counsellor at college for a few sessions when he became very anxious about his exams and had found this helpful. Apart from this he has had no previous treatment for mental health difficulties. On examination C said that things had become significantly worse over the past 6 months when there had been threats of redundancies in his workplace. He describes being unable to relax, constantly thinking about mistakes he might have made, colleagues he might have upset and what might happen in the future. He has noticed himself getting more wound up than usual about everyday events outside work as well. Recently he has been so exhausted and anxious that he has taken days off work, which worries him more and has prompted him to seek psychological support.

Impact

All the three patients highlighted that their anxiety had significantly and negatively affected their lives. They mentioned that because of the disabling anxiety they avoid meeting people including friends and family because of the fear of being judged negatively. They said the overwhelming anxiety interferes with their daily activities, and approximately their productively has reduced by up to 75%.

Assessment

The patient were assessed at pre, mid, and post-treatment, and at 3-months follow-up. A detailed case history was taken from the patients and their family members followed by Mental Status Examination. Self-report measures that were used included the Beck Depression Inventory–II (BDI-II; Beck et al. 1996), the Beck Anxiety Inventory (BAI; Beck et

al. 1988), and the Clinical scales and daily diaries. Daily diaries were completed every day for the duration of the therapy program to measure Anxiety-related symptoms such as restlessness, shortage of breath, fidgety (O'Connor & Robillard 1999).

Case Conceptualization

This presentation of above clinical cases corresponds to diagnosis of Anxiety.

3.4. Course of treatment and assessment of progress

The therapy protocol was composed of two clinical evaluation sessions, which allowed the therapist to identify a hierarchy of the participant's anxiety producing cognitions, and primary as well as secondary inferences. Followed by 5 ReAttach therapy sessions. Measures were taken at the end of therapy, i.e. at 5th session and 3 months post treatment.

Evaluation sessions were followed by 5 weekly sessions of ReAttach therapy. According to the ReAttach model, anxiety is produced and upheld from an initial groundless cognitive biases, irrespective of type of anxiety (see Figure 2). First, a trigger produces an anxiety generating idea (or a primary inference). Next, when the bias is established in the person's mind, it leads to anticipation of disastrous consequences associated with this bias. For example, when A would see her old boyfriend (trigger), she started thinking: "I am no more likable" Then, she anticipated a negative consequence that provoked feelings of anxiety and pushed her to feeling bad about her and start crying: "I am sure that if I could not maintain this relationship, I will never be able to have one, and no one will like me ever, and so on". It is important to understand that a participant's internal schemas plays a significant role in the development and maintenance of the cognitive biases. This schemas is based on important reasoning biases such as selective use of out-of-context facts where abstract facts are inappropriately applied to specific personal contexts to justify the compulsion.

ReAttach therapy allows the participant to change the internal schemas that maintains primary inferences to adhere to a more realistic scenario, which can in turn help change behaviour. As, ReAttach considers that anxiety originate from interior schemas based on invalid inductive arguments specific to each anxiety producing situation. Clients learn to change their schemas. The key point to clarify with individuals is whether the anxiety producing cognitions are realistic; their schemas is never derived from evidence confirming the bias in the "here and now". Schemas help maintain the anxious thoughts (primary inference) and the anxious behaviours because the person behaves as if the anxiety

producing cognitions were highly probable. The ReAttach model of the maintenance of Anxiety is schematically presented below. The model's components are defined in further detail below.

Figure 3.2. *Schematic representation of the ReAttach model of the maintenance of Anxiety Symptoms*

Maintenance of Anxiety Symptoms

The 5 ReAttach sessions involved establishing (a) the distinction between an anxiety producing cognitions and a normal thoughts, (b) the Mentalization process, (c) the altering concepts (d) learning new ways to interpret the situation, (e) generalization of learning, (f) identification of reasoning errors that create and maintain the anxious schemas, (g) establishing the false nature of the anxiety producing ideas, (h) the selective nature of anxiety producing ideas, (i) desensitization.

Mentalization: Mentalization is the ability to think about what is we are thinking and what others might be. One more way of describing this is as being able to see ourselves from the outside, and others from the inside. This concept of sympathetically view other's intentions is the core of "Mentalization". Through mentalizing we make sense of each other and ourselves, internally and externally, in terms of the idiosyncratic conditions and mental processes. It is a profoundly social construct in the sense that we are attentive to the mental states of those we are with, physically or psychologically. Mentalization relates to how people make sense of their social world by imagining how other peoples' states of mind that could influence their behaviour. For example, after receiving no response from his girlfriend, a man could assume that she is not interested in him, that she sees him as a nuisance or that she has gone off with someone else. He might conclude that she won't be there for him. He could feel annoyed or anxious, and end up isolating himself or checking for phone messages repeatedly. His beliefs about his partner's intentions could therefore have a bearing on his feelings and behaviour.

CBM 1: Altering Concepts

For individuals with Anxiety Disorders it is very important to start

with the retrieval of fragmented information to reprocess it and form coherent and realistic perception of threats.

CBM 2: Learning

For virtual learning with CBM2 more realistic future imagination needs to be activated in individuals with Anxiety Disorders. If this goal has been achieved there is a range of learning options. Let's consider some other options that might be important for individuals with Anxiety Disorders. There are different levels of functioning and socio-cognitive adaption in Anxiety Disorders, which in fact are related to the ability to integrate the skills possessed and use them to achieve a goal (Di Renzo 2016).

In CBM2 the focus lies on activation of unfolded areas or disrupted areas (neurodegeneration). Instead of using the strengths the focus lies on under-stimulated skills that are trained in a virtual experience and after that this experience will be integrated and memorized. For complex developmental disorders hemisphere-specific activation and generalization is a great option. By enhancing activation in the target hemisphere for example by motor imaging in a virtual experience, integrating the experience (memorizing) the freshly trained skills can be used for generalization during successive instructions. Individuals with mental health issues other than Anxiety Disorders can benefit from CBM2 by improving coping styles or problem solving techniques.

CBM3 (De) Sensitization

Individuals who are sensitive to negative experiences in the past, tend to have a negative bias about themselves, their past but also about future events. Desensitization of the negativity is not enough to make them feel good: it rather makes them feel empty. CBM3 is about desensitization of the negativity and sensitization of positivity at the same time. New positive experiences about the past, the present and the future are added to activate sensitization towards positive thoughts and feelings representing the self, significant others and the world. Active integration of these new experiences by memorizing perpetuates the altered cognitive biases.

Critical Factors

All the three patients showed significant motivation and a considerably high degree of insight throughout the course of therapy. Therapist assessed the level of motivation by their attendance and involvement in therapy as well as their willingness to change. However, they often did

not complete the necessary homework exercises that were required of them and they gave the therapist many reasons why they did not. These resistances were addressed in therapy and the participants admitted being aware of the disabling nature of their anxiety but mentioned that they could not behave otherwise in periods of high stress. Moreover, their avoidant traits could have affected their prognosis negatively. Since the end of treatment, they have been capable of initiating many tasks on their own such as making a study plan etc.

Follow-Up

At 3-month follow-up interview, patients revealed that they have started to prioritize taking action. For example, A delegated household tasks to a domestic help, which reduced her daily obligations and allowed her to apply the strategies she learned in therapy.

Treatment Implications

Several clinical implications stem from understanding the therapeutic trajectory of the patients. They were insightful regarding their problem and were highly motivated to get rid of them. In fact, only after first session, they were able to look objectively toward their anxious behaviours and could develop some amount of control on them. ReAttach was adapted to meet the needs of anxious patients. In fact, because the nature of their anxiety was often very egodystonic, and anxious thoughts are often passive and leading to avoidance behaviours, their distress was more to the subsequent behavioural problems than anxious thoughts. Nevertheless, it is very difficult for anxious patients to accept that these behavioural problems are due to anxious producing ideas. According to them, their anxious thoughts are justified. In addition, beliefs supporting the excessive worry were considered as appropriate threat perception. Unlike traditional CBT that uses techniques such as exposure to a hierarchy of memories according to their anxiogenic potential, ReAttach leads to generalization of learned skills across all stressful and worrisome situations. It was notable that patients improved upon their anxiety producing appraisal of the situation.

ReAttach therapy aimed to weaken the conviction toward primary biases. Thus, as primary biases are the first step towards Anxiety sequence, it is estimated that if we modify them, it will lead to significant therapeutic effects on the rest of the Anxiety sequence, including secondary biases, anxious and behaviour. As part of the CBM, ReAttach therapists helped the patient to recognize that anxiety arise from an unrealistic perception of threat and helped them explores the difference between an anxiety producing thought and a normal thought. Patients understood this

concept and admitted that the anxiety producing cognitions partly explains why they had this problem. They mentioned that one of the reasons that she had an anxiety problem was indeed because they felt that these perceptions of threat were real and may cause serious damage to their life, self-esteem and future life. The therapist then explored with patients the concept of anxiety producing thoughts as an imaginary component, which allowed the therapist to work on their anxiety producing schemas. Patients were asked to create a non-anxiety scenario for them to understand that both scenarios are stories that can seem realistic.

The therapist then helped the patients recognize that their biases arises from their imagination and they learned what led them to cross the boundary from reality to imagination. The therapist then helped them realize how the reasoning tools biased for producing anxiety which are part of their general schemas caused a cognitive bias be experienced as though a real phenomenon. They were showed examples of the anxiety related believes and how they lead to confusion between reality and imagination.

To arrive at the next step, the therapist showed the patients that in non-anxiety situations, they are perfectly able to reason in a logical and realistic manner. In fact, they identified a series of questions to ask themselves before experiencing the anxiety in many situations.

The last therapy step consists in helping the patients find the vulnerable cognitive schemas that maintain their problem and that reinforce their anxiety producing cognitions. Patients had a lot of difficulty in refuting their anxiety producing ideas. Even at the end of therapy, they continued to feel vulnerable to all the situations were causing them anxiety. By exploring this tendency with them, it became evident to them that their anxious behaviours were linked to their self-schema "I cannot cope with situation; people around me will not love me if I exist if I lose my job".

Results

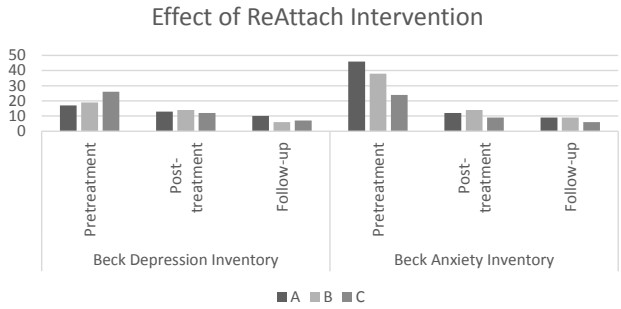
All patients provided informed consent, pre-tests, post-tests and follow up results.

Table 3.1: shows the results on the Beck Depression Inventory and the Beck Anxiety Inventory before ReAttach, after 5 ReAttach sessions and at the follow up. Significant positive changes were obtained in the 3 case studies which is reflected in **figure 3.3**.

Table 3.1. *Pre-treatment, Post-treatment, and Follow-Up Scores on Self-Reported Clinical Measures*

Patient ID	Beck Depression Inventory			Beck Anxiety Inventory		
	Pre-treatment	Post-treatment	Follow-up	Pre-treatment	Post-treatment	Follow-up
A	17	13	10	46	12	9
B	19	14	6	38	14	9
C	26	12	7	24	9	6

Figure 3.3. *Pre-treatment, Post-treatment, and Follow-Up Scores on Self-Reported Clinical Measures*



3.5. Recommendations

Therapists should be very careful while treating an individual suffering from Anxiety and as if they are not able modify their cognitive biases the therapy itself may become an anxiety producing condition. It is indispensable to carry out appropriate assessment to establish diagnosis and also to evaluate therapeutic outcomes, including improvements in the patient's environment due to the therapeutic intervention. Author realized that he underestimated progress and expected outcomes during the therapy. However, the pre- and post-treatment assessments reflected the considerable amount of change.

Moreover, although it is believed that anxiety disorders usually a need for extended therapy sessions, patients responded well to a short term (5

sessions) ReAttach based program. In the first session, they understood the logic of the ReAttach model and that the cognitions maintaining their anxiety are relatively unrealistic. This underlines the importance of working on cognitions, decision making, and reflecting on the nature of the person's appraisal of the environment and anxiety producing cognitions.

Additionally, social and environmental factors associated with the patients are important considerations. At times patients live alone, are emotionally isolated, and have very little or no support. Anxiety many time is co-morbid with depression (Samuels et al. 2002, Steketee & Frost 2003) and patients are reluctant to engage with people, tend to avoid contact with others and seek support. And, this may influence the prognosis. This did not interfere with the ReAttach treatment outcome which suggests that they identified strongly with the ReAttach model. To conclude… Finally, as expected by the ReAttach model, post-treatment anxiety symptoms were significantly reduced as well as all other depressive symptoms.

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Chapter 4

Treatment of autism aspects and overlapping symptomatology from a network perspective of clinical neuropsychiatry

Paula Weerkamp-Bartholomeus

Abstract

Autism Spectrum Disorder can be defined as a complex and heterogeneous area of clinical characteristics, determined by multiple aspects that interact with one another. The past decade we have seen researchers (Happé, 2006), who denounce a single explanation for autism spectrum disorders. The past few years there has been a paradigm shift in the characterization of neuropsychiatric disorders from categorical descriptions towards a dimensional view (Cuthbert, 2015). Nowadays there is a shift from this unidimensional perspective towards a network perspective of psychopathological disorders (Nuijten, 2016). This network perspective of clinical symptomatology offers new insights for the treatment of Aspects of Autism and overlapping symptomatology in *Clinical Neuropsychiatry*.

The implications for prevention, secondary prevention and treatment of autism aspects will be discussed. Recommendations for activation of developmental potential using an ortho-pedagogical multi-symptomatology network approach will be made.

4.1. Introduction

The concept 'autism spectrum disorder (ASD)' refers to a complex and heterogeneous area of clinical characteristics as described in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013). The Centre of Disease Control and Prevention (CDC) reported a prevalence of approximately 1 in 45 in the US according their surveillance of 2014 (Zablotsky, 2015).

Many of us have a child, a partner, a family member or a friend with Autism Spectrum Disorder and many of us have been diagnosed with

this label ourselves. Investigating into Autism Spectrum Disorder to comprehend this atypical phenomenon typically starts with exploring the differences between normal development and clinical impairment. The diagnosis of Autism Spectrum Disorder comes with expectations of developmental outcome and behaviour which can be discouraging for the individual. For many people, to be referred to as different may feel like a disqualification. It is therefore not surprising that the diagnosis Autism Spectrum Disorder hurts many and that we must look for a more human way to frame the developmental challenges individuals with autism are facing.

The development of an autism intervention refers to finding solutions for problems and challenges individuals with autism are facing. It starts with questioning how we can solve these problems and to find out whether our well-meant clinical practises are acceptable, beneficial or not. There is a human tendency, a confirmation bias, to seek out information which one believes or desires to be true. The wish to construct a practical intervention as a solution for developmental problems of individuals with Autism Spectrum Disorder might cause a certain blindness for information that proves it to be untrue or not possible. A negative cognitive bias however, might disrupt our perspective to see potential solutions. By considering problems or conditions to be undeniably unsolvable we will stop searching for answers. How well can we define Autism Spectrum Disorder? Autism Spectrum Disorder can be defined as a complex and heterogeneous area of clinical characteristics, determined by multiple aspects that interact with one another. There are researchers (Happé, 2006) who denounce a single explanation for autism spectrum disorders and over the past few years there has been a paradigm shift in the characterization of neuropsychiatric disorders away from categorical descriptions towards a dimensional view (Cuthbert, 2015). The shift from a unidimensional perspective towards a network perspective of psychopathological disorders (Nuijten, 2016). The network model supports the idea that we do not need to reduce the complexity of autism to a single concept to find treatment possibilities. If we approach the clinical presentations of autism in their full complexity as sets of symptoms and their interrelations (Nuijten, 2016), we might obtain activation of developmental potential, by influencing interacting symptomatology. ReAttach is a multimodal approach addressing towards multiple factors in symptomatology networks of psychopathological disorders including ASD.

Individually there are many differences in psychological functioning. ReAttach is focusing on similarity in cognitive processing of information, emotions and events. The underlying structure of ReAttach is based on ortho-pedagogical influencing obstructing factors and facilitating optimal conditions for cognitive functioning and growth. ReAttach for autism is made up from the following components: arousal regulation, tactile stimuli and joint attention, multiple sensory integration processing, conceptualization and cognitive bias modification.

4.2. Autism aspects

In previous work the potential benefit for individuals with ASD has been explored with the Autism Treatment Evaluation Checklist (ATEC) (Rimland, 1991) (Weerkamp Bartholomeus, 2015). The ATEC was designed to provide an inventory of *problems* that individuals with autism encounter daily and consists of four subcategories: I. Speech/Language/Communication, II Sociability, III Sensory/Cognitive Awareness and IV Health. The results suggest that individuals within the entire range of ASD can benefit from ReAttach in terms of reduction of problems in daily life functioning.

From an ortho-pedagogical point of view, reduction of problems may be important in terms of removing development barriers, however provide no clues about activation of developmental potential. Basic skills training of the technical skills of ReAttach leaves students unclear about the draft of development goals and how to adapt at individual development needs.

Activation of development

Parents and professional educators are responsible for their children until they have reached the phase of self-responsibility and self-determination (Langeveld, 1979). For many families and individuals with ASD this stage of autonomy and independency is not feasible yet. A lot of individuals with disabilities need to rely on the help of others for their whole lives. Self-responsibility and self-determination are nevertheless developmental goals for all individuals and we strive to work towards these goals as much as possible. Before we can reach this point, gaps in individual development will have to be filled, for instance learning how to connect, how to communicate and how to engage in social interaction.

Social communication problems are one of the core characteristics of autism spectrum disorders. Individuals with autism will commonly be delayed in language and the communication skills can be very different from neuro-typical children (Fitzgerald, 2017). The ability to participate in social communication and pragmatic skills are very important aspects of language development. These skills require comprehension, language production and interest and engagement the social interaction.

ReAttach is focusing on *reduction* of problems with emotion regulation, multi-sensory processing, conceptualisation and affective mentalization. The method then focuses on *activation* of potential growth: self-awareness, acceptance of self and others and activation of:

- Multiple Sensory Processing
- Social Initiative, Engagement, Joint Attention
- Social Communication Skills
- Imagination, anticipation

- Behaviour Control
- Affective Mentalization
- Self-Reflection
- Self-Responsibility
- Pro-Active Coping

Children with autism: a family approach

Parenting is a dynamic process in which the parent represents another person, while using a climate that promotes personal growth and by applying life situations in such a way that they offer optimal opportunities for self-development (Kok, 1980) (Kok, 2003). In a family system with children with ASD, parenting is not so easy and all family members experience special challenges. The task to bring up one or more children with autism is quite confusing which causes feeling of uncertainties, incompetence and perhaps insufficiency. At the same time, many parents carry on some emotional inheritance from their own childhood or experience relationship problems in their marriage or at work. These stress-factors negatively influence the current family relationships.

ReAttach starts with the reduction of problems in daily life functioning of the parents (Weerkamp Bartholomeus 2015) as part of the ReAttach Protocol for children. In order to reduce maladaptive patterns in parents and to activate emotional stability and adequate coping styles, parents are offered ReAttach sessions. In many families with autism the ReAttach therapist needs to work at a *dynamic* expectation of the future too. When the expectations of the autistic child in terms of connection, social communication, social interaction and other developmental goals are too rigid or too limited, the developmental opportunities will be far from optimal. The ReAttach therapist will work at a more optimistic realistic expectation of the child's future skills.

Aspects of autism checklist: an observation guideline

The aspects of autism checklist are designed as a tool therapists can use to focus on the next stage in development of individuals with autism and complex developmental problems. Using this guideline demands accurate observation before the therapist decides to choose learning opportunities. The checklist also offers the possibility to monitor and evaluate treatment outcome in terms of growth. The therapist examines 12 development milestones and indicates how well these skills have been developed. The scores vary from 0 (this skill has not been developed yet) up to 4 (adequately developed).

CON	Conversation	The ability to start and/or participate in social communication
OQ	Open Question	The ability to answer a an open question without help
COH	Coherent	The content of speech is coherent (instead of fragmented)
EXP	Expression	Intonation, Mimics, Gestures
ToM	Theory of Mind	Perspective taking
JA	Joint Attention	Social Initiative and Engagement
REG	Regulation	Independent arousal and emotion regulation
IMA	Imagination	Ability to imagine and anticipate
BI	Broad Interest	Broad Interest (absence of preoccupation)
REF	Self-Reflection	Introspection
RES	Self-Responsibility	Being responsible, answerable within one's power
PA	Pro-Active Coping	Ability to take efforts to achieve goals or beneficial outcomes

To describe the ReAttach for autism protocol we will start with the intervention for adults and children without a double diagnosis.

4.3. ReAttach for autism protocol

The protocol for individuals with autism is characterized by activating the skills that are required for integration, conceptualisation, imagination, reflection and coping.

1. ReAttach starts with the external arousal regulation by the therapist through his behaviour and by offering optimal conditions to obtain optimal arousal conditions.
2. Under optimal arousal conditions the therapists start with the activation of the social reward system by gentle tactile input (tapping) and hereby stimulation of Oxytocin production. When the social reward system has been activated well enough to proceed, the person with autism will show social initiative towards the therapist (eye-contact).
3. The therapist will invite the individual with autism to engage in joint attention while maintaining eye-contact.
4. Sounds will be added or verbal prompts will be given to activate auditive information processing
5. The therapist will appeal to emotional expression (for instance by making the individual with autism laugh)
6. Adults will be asked to close the eyes for better performance of the social cognitive training. Children may keep their eyes open. It is important to maintain the eye-contact with the child and to stay engaged in joint attention during the rest of the ReAttach for autism protocol.
7. The social cognitive training starts with the concept of self and the

verbal prompt of the name.

8. Significant others need to be recognisable for the individual with autism: parents, partner, colleagues and friends. For some individuals with autism it is very hard to focus on these concepts. It might be an option to choose a preoccupation such as Pokémon as a start to do these first exercises of conceptualisation. Individuals with autism and cognitive disabilities who are young or have a poor understanding of language will only practise conceptualisation and differentiation between the self and other as a start.
9. For individuals with autism and normal intelligence or intellectual ages above 3 or 4 years it is important to proceed with the affective mentalisation prompt. This development only requires activation, which means that the therapist will ask the individual with autism "to give it a try". Verbal prompts need to be adjusted to help the individual with autism to follow through. Explanation before the session start is wise especially for high functioning individuals with autism who tend to interrupt the session and discuss that the demand to "pretend you are… or look through the eyes of" will be impossible.
10. The most complicated verbal prompt (about the relationship between 2 others) can be added for each individual with autism who is able to perform the affective mentalisation prompt. The processing time needs at least to be 20 seconds to automate multiple sensory processing.
11. Activation of coherent concepts of self and significant others is not enough to make self-awareness, self-reflection, and self-regulation possible. There is a developmental delay in coherent information processing which means that the stored data in the long term memory is still fragmentised and that the freshly build concepts can grow stronger by adding these pieces of the puzzle in a coherent way. The therapist will ask to search as many aspects of the self and significant others while facilitating coherent processing in the low tapping speed. It is important that the therapist will address to the self and the concepts that need to be filled.
12. Some individuals with autism have a lot of imagination, while others did not develop imagination at all. Imagination is a very important skill. We need imagination to anticipate at future events, for our executive functioning (organisation and planning) and to set goals for intentional growth. With CBM2 imagination can be trained by asking the individual with autism to "try to imagine …". while choosing a very simple task. Successful activation of imagination can be easily detected in spontaneous social communication. We just need to ask for anticipation or imagination and see if this skill has been trained already.
13. During each ReAttach for Autism session the multisensory processing and coherent thinking will be automated (repetition) and new learning opportunities will be created by extending the activated developmental potential. The aspects of autism checklist serves as

a guideline for the therapist to monitor, evaluate and to formulate future goals for development.

4.4. The complexity of comorbidity and overlapping symptomatology

Adults with clinical presentations that show a lot of resemblance with autism sometimes have been misdiagnosed with (single) autism which has significant implications for treatment. There are many overlapping features of autism/Asperger's syndrome, schizophrenia (Fizgerald, 2012) but also overlap with other severe psychiatric conditions such as dissociative identity disorders, OCD, narcissistic pathology and psychopathy. These psychiatric conditions all have serious impediments in common, however they require their own specific ReAttach approach. The next study will describe the ReAttach intervention outcome of 22 patients with aspects of autism and the complications that occurred in offering ReAttach sessions to a group of patients who all were diagnosed with ASD.

Method

A population of 22 patients, diagnosed with autism provided informed consent and were offered 5 sessions of ReAttach for autism (Male 54.55%, age M=16.27, SD=8.09, 7-37). Out of 22 patients, 6 were diagnosed with cognitive impairment. The items on the aspects of autism checklist were scored by the therapists before and after the ReAttach sessions and for all participants pre- and post-observations were compared. Primary goal of the ReAttach for autism is activation of development.

Results

Figure 4.1. *Mean pre- and post-test scores on the Aspects of Autism Checklist items*

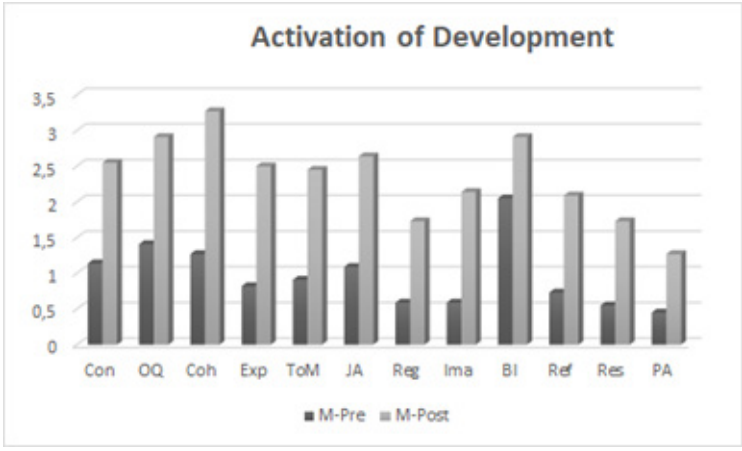
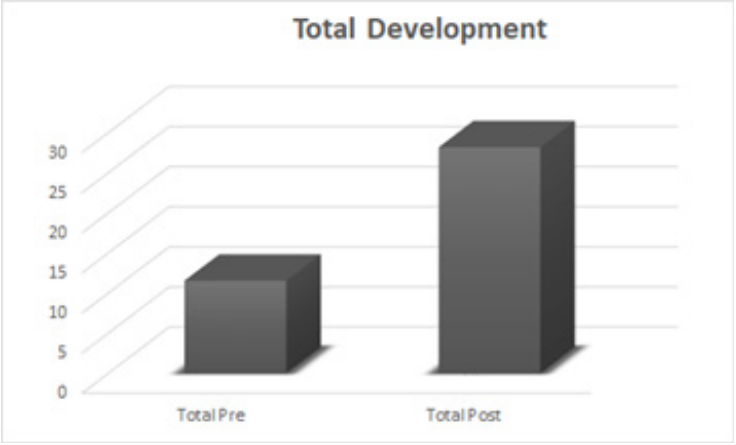


Figure 4.2. *Mean pre- and post-test total scores on the Aspects of Autism Checklist items*



Total development

Comparison of mean scores on the aspects of autism checklist are shown in **figure 4.1** and **4.2**.

For individuals with a pervasive developmental disorder it is not obvious to learn new skills in the area of social communication, emotion regulation or self-reflection. The clinical observations revealed growth in all autism aspects which is far more than we expected based on the diagnose "pervasive developmental disorder"/ASD.

Conversation

Before ReAttach 9 individuals were not able to start a conversation or to participate in social communication by themselves (male 55.56%, age M=14, SD=4.69, 7-23). Out of 9 patients 7 could learn this to a certain extent and 2 patients didn't show any development yet (**figure 4.3**)

Coherency

Although not all patients learned *how to start or to how stay engaged* in social communication, it was very interesting to notice that all patients developed more *coherent speech*. At the start there were only 9 out of 22 patients whose speech was typically fragmented without any coherency at all (male 33.33%, age M=13.78, SD 7.51, 7-32). **Figure 4.4** shows the development of coherent speech of these individuals.

Figure 4.3. *Improvement of starting a conversation for 9 patients who didn't have the ability to start a conversation before ReAttach*

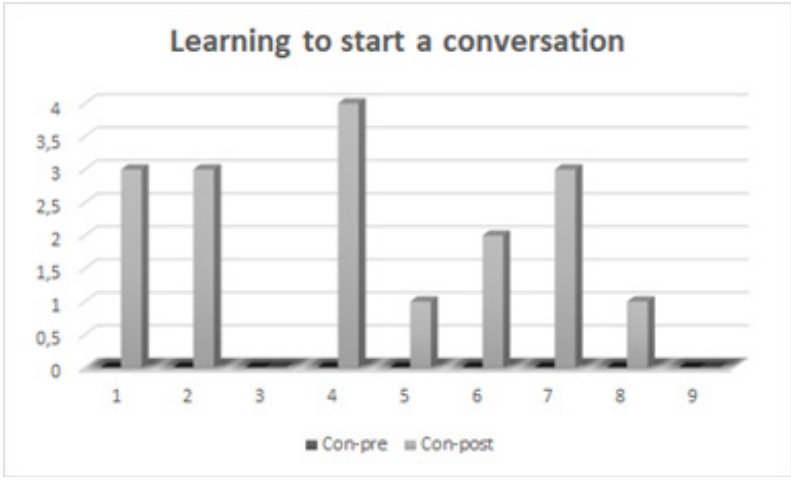
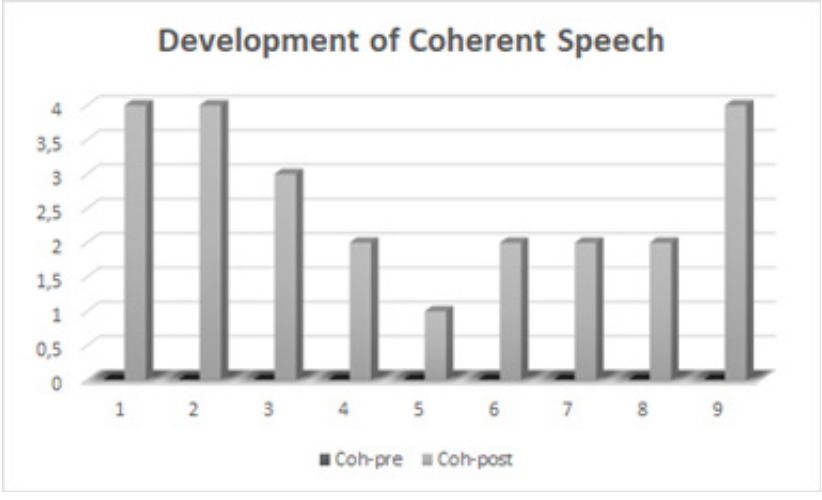


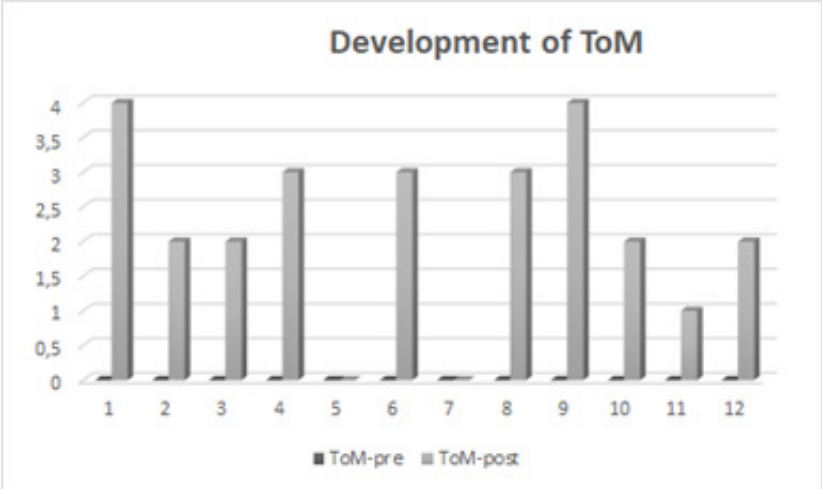
Figure 4.4. *Development of coherent speech*



Theory of Mind

Theory of Mind was not developed in 12 out of 22 patients (male 41.67, age 17.08, SD=9.20, 7-37). Before ReAttach these 12 patients failed on the ability of perspective taking. **Figure 4.5** shows their development of perspective taking: 10 out of 12 patients started to develop Theory of Mind. This ability was examined in the social interaction before and after ReAttach sessions. After ReAttach a young patient reported: "Now I understand that my brother has a lot of trouble with me, because I never want to share with him". An adult spontaneously told us that he thought we would be very curious about what was going on inside his head.

Figure 4.5. *Development of Theory of Mind*



Joint Attention

Out of 22, in 9 patients Joint Attention was absent before the start of the ReAttach sessions (male 55.56%, age M=18.67, SD=9.95, 7-37). All these patients have developed Joint Attention at some extent, although for some individuals, specifically those with the cognitive impairment or children with hyperactivity this remained quite a challenge. **Figure 4.6** represents the development of Joint Attention.

Imagination

Out of 22, in 13 patients Imagination was absent before the start of the ReAttach sessions (male 46.15%, age M=18.54, SD=8.38, 7-37). Imagination has started to develop in 12 out of 13 patients as you can see in **figure 7**.

After ReAttach some therapists offered the children some time to play to examine imagination. Most children and adults spontaneously reported what they imagined during the ReAttach session and how they experienced this. Most of the participants were happy and felt excited about this new experience.

Figure 4.6. *Development of Joint Attention*

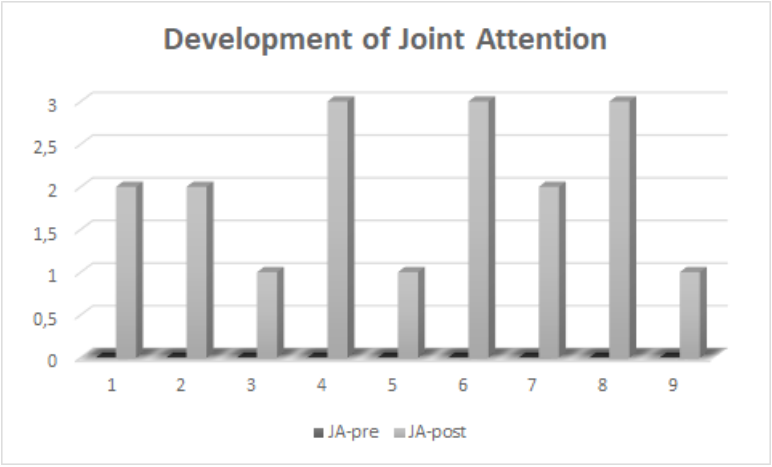
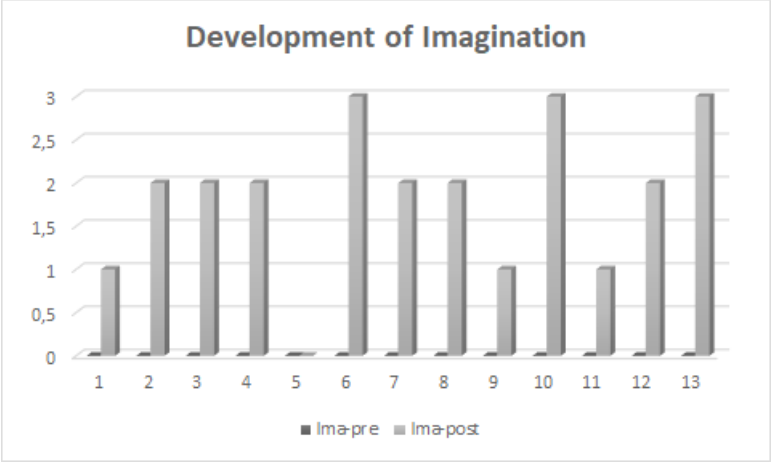


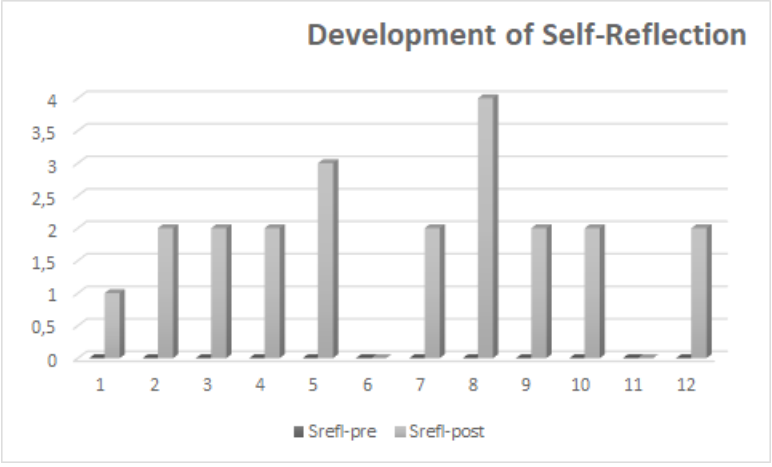
Figure 4.7. *Development of Imagination*



Self-Reflection

Out of 22, in 12 patients the ability of self-reflection was not developed before the start of ReAttach (male 58.33, age M=15, SD=8.30, 7-37). **Figure 4.8** shows the development of Self-Reflection in 10 out of 12 patients.

Figure 4.8. *Development of Self-Reflection*



Effectivity

Pre- to post treatment comparison of mean scores on the aspects of autism checklist are presented in **table 4.1**.

This group measurements shows activation of all developmental milestones in this group of people with aspects of autism. The results are positive and significant with effect sizes varying from moderate to large. However, a *more detailed view* at the clinical observations before the start of ReAttach *will shed another light* on the treatment process and the measured results.

Clinical Presentations and individual adjustments

The complexity of speech

One 13 year old male patient who could not start a conversation or keep a conversation going answered short but relatively coherent to the questions asked by the therapist. The therapists scored 5 for coherent speech although the other developmental milestones were very low. Deferred echolalia can be easily overlooked: the patient answers questions

Table 4.1. *Pre- to post treatment comparison of mean scores on the aspects of autism checklist*

	M1, SD1	M2, SD2	M2-M1	t(df)p	ES
CON	1.14, 1.17	2.55, 1.22	1.41	4.96(21) 0.000	1.18
OQ	1.41, 1.10	2.91, 1.23	1.50	6.38(21), 0.000	1.29
COH	1.27, 1.35	3.27, 1.08	2.00	7.37(21), 0.000	1.64
EXP	0.82, 0.91	2.50, 1.01	1.68	8.83(21), 0.000	1.75
ToM	0.91, 1.11	2.46, 1.14	1.55	5.04(21), 0.000	1.38
JA	1.09, 1.19	2.64, 0.90	1.55	7.17(21), 0.000	1.48
REG	0.59, 0.73	1.73, 0.83	1.14	6.39(21), 0.000	1.46
IMA	0.59, 0.80	2.14, 0.83	1.55	7.95(21), 0.000	1.89
BI	2.05, 1.59	2.91, 0.97	0.86	2.84(21), 0.010	0.65
REF	0.73, 0.94	2.09, 0.92	1.36	6.10(21), 0.000	1.46
RES	0.55, 0.86	1.73, 1.16	1.18	5.79(21), 0.000	1.16
PA	0.45, 0.86	1.27, 0.94	0.82	4.50(21), 0.000	0.91
Total	11.55, 8.81	28.18, 8.92	16.64	9.85(21), 0.000	1.88

that have been asked many times before and had been modelled by parents. Only one patient out of 20 scored this high on coherency before ReAttach.

Language comprehension

Although the intervention doesn't appeal so much to language comprehension, confusion arises very quickly in communication with individuals with ASD. This confusion might interfere with the ReAttach session, for instance because the patient expects to find answers on the verbal prompts that might be interpreted as questions.

Clarification is needed to eliminate the uncertainty in patients with autism who like to cooperate, provided that they understand exactly what is expected from them. Explanations in advance with visual support, can eliminate the uncertainty but also work as a distraction. Children who depend on visual tasks analysis during ReAttach are not able to stay focused at the therapist, to maintain the eye-contact and joint attention that is needed.

Delusions

Delusions, usually of the paranoid type can occur in ASD but they are of the less severe type than in schizophrenia (Abell, 2005). Out of 22 patients 2 male adults expressed hostility and distrust towards others:

One patient a 37-year old male with autism and cognitive impairment

scored overall low scores on the Aspects of Autism Checklist. His speech was fragmented, monotonous and there was lack of mimicry. He didn't know how to start or to engage in social interaction, there was no social initiative, lack of eye-contact and his answers were short and negative. This patient did not show any insight in his behaviour nor could he regulate himself or find solutions for his discomfort. He showed no internal locus of control but he expressed feeling threatened by humanity. He refused to actively participate in a world that seemed too demanding and too difficult to understand. Most of the time this oppositional behaviour worked out well for him: it resulted in less activation and demands by others. This patient accepted the intervention when the therapist explained that he didn't have to do anything but trying to listen to the verbal prompts. The man responded quite well and changed dramatically: his negativity and distrust changed into a cooperative, friendly and active engagement in social interaction. His facial expression and eye-contact improved and he was able to express his needs. Intrinsic motivation developed as a result of the self-awareness and explorative urge to do things by him*self*.

Another male patient of 28 years old was obviously very anxious and confused before the first ReAttach session. His fluent, fast agitated speech was fragmented and "didn't make sense". He had brought a weapon in the honestly showed it, while expressing a lot of confusion: he wanted to die, to kill and to survive at the same time.

The clinical presentation varied a lot as if there were different persons in the room telling different stories with little overlap: one moment he expressed that he was in pain and the next moment he claimed that he couldn't feel pain or bodily sensations. The therapist indicated how confusing it was to him that it seemed as if he had to deal with several people. This patient agreed that this was confusing for him too.

The therapist made a drawing of an 'outsider' looking at several persons as several aspects of this patients story. The outsider was included in the ReAttach protocol as a significant other that was used to look at those aspects of self from the perspective of the outsider (affective mentalization prompt). Although this patient showed a lot of distrust, he was easily motivated to follow through the ReAttach session. From the very beginning he felt that his stress-levels went down and that his social reward system was activated: it was overall a pleasant experience. He subscribed feeling his tension and stress while feeling wonderful at the same time! The affective mentalization prompt was very exciting and confronting. Although he still felt quite tense the confusion disappeared, his facial expression became more lively and his conversation started to make sense.

The second session this patient was intrinsically motivated to work at his personal development. His clinical presentation had been improved: coherent speech, understandable, no confusion. This patient realized that he still had a lot of work to realize his dreams: being independent, self-supportive and living a good live.

Who am I ?

A 17-year old male diagnosed with Asperger's Syndrome participated in ReAttach therapy sessions.

Although this young man was very motivated, he had a problem to follow through. Each time the therapist asked him to think about himself he started to discuss the fact that he had no idea what to do. The verbal prompt was changed in "look at yourself" and this was even more confusing: without a mirror this didn't make any sense. The next session the therapist brought a mirror and this patient started to discuss how much he disliked to look into the mirror and to explain that he only was motivated to use this mirror to comb his hair.

The therapist put the mirror on the table and told him that the mirror was just an extra tool to help him to complete the ReAttach session. Indeed: the therapist was able to continue the full ReAttach protocol after the instruction to "look at yourself in the mirror in front of you".

Starting the 'multiple sensory processing engine'

Sometimes individuals with ASD are *motivated* to engage in ReAttach sessions but are *not ready* to proceed yet.

The therapist can see that there is social initiative and eye-contact but the sensory input seems to be processed in a monotropic (fragmented) way. The 'multiple sensory processing engine' cannot be started unless

Figure 4.1. *More than one self-representation*

this problem is solved.

For children, a little game with arousal regulation in combination with a longer period of tapping may be enough to get ready for ReAttach. There are many game options but the main goal needs to be optimal arousal and emotion expression during the tapping while remaining eye-contact. Making fun is a powerful tool to create optimal conditions to proceed.

Adults might regard this kind of game as childish and might feel insulted by this. Instead of playing a game the therapist may ask adults to focus on the area just above the eyebrows while regulating the arousal with voice and tapping to the upper limit of the high arousal range. After a few seconds the therapist will regulate the arousal to the low arousal range. Usually repeating this 'warming up' exercise to stimulate the prefrontal cortex, 5-8 times is enough to start the 'multiple sensory processing engine': improved facial expression will tell us that it is time to give it a go.

4.5. Treatment of overlapping symptomatology

It is very interesting to review etiological aspects of emotion regulation problems in order to find the best way to optimise development outcome of patients diagnosed with Borderline Personality Disorder, Dissociative Identity Disorder, Schizophrenia and Narcissism.

Being human has a lot to do with interpersonal relations and when these relations are at stake (or *assumed* to be at stake) we will feel pretty distressed. Social isolation is a terrifying scenario because it deprives us from a lot of feelings that we long for: safety, security, belonging, acceptance, love. Naturally we will do a lot of things to prevent social isolation from happening or to make sure that we act as such a good human being that we think social isolation will be very unlikely to happen. Nevertheless, we have to deal with diversity and the fact that we all have our preferences which means that we do not like everyone nor will everyone like us. No matter how hard we try there will be only a small percentage of all people that will be fond of who we really are. Considering social isolation as a threat it, is understandable that we would like to exercise control in interpersonal relations. Individuals who feel less in control tend to be more easily distressed which can be objectivated by measurement of Cortisol levels and hippocampal volume (O'Brien, 2004). The concept '*pronounced* locus of control' refers to *the extent* to which individuals *believe* they can control events that affect them (Lefcourt 2014). The more pronounced *internal* locus of control the more confidence you have in your ability to influence events positively, which reduces anxiety levels, whether we actually are in charge or not. Well equipped with such an *optimism bias*, we are able to successfully deal with our fear of social isolation and to engage in spontaneous social

interaction. For many of us interpersonal relations and social dynamics are not that easy at all. The more pronounced *external* locus of control the more you feel controlled by others which results in feelings of helplessness, powerlessness or dependency. Instead of an optimism bias, anxiety, depression and negativism dominate your perception, feelings and thoughts. Our brain differentiates between internal processes and external activities produced by sensory information. When this ability is compromised people will end up perceiving internal monologues as hearing language spoken by an actual person (Allen, 2008). Individuals with hallucinations will experience *external* locus of control and "loose" their confidence in terms of loss of internal locus of control. This dramatically interferes with their mental model about the world. These individuals will end up doubting the general (social) understanding, not knowing what to expect anymore as if the world has become unpredictable and is constantly changing. If you are not able to rely anymore on the concepts of self, significant others, having lost these connections as well as the comprehension of social interactions you might end up believing you are socially isolated, misunderstood and different. All this causes a lot of aspects of autism: overlapping symptomatology in these Clinical Neuropsychiatric presentations.

Introduction

Targeting symptomatology can be regarded as offering help without stigmatisation. Socialization alone, can already reduce symptoms, cognitive deficits and improve neurogenesis, regardless of mental symptoms (Famitafreshi, 2016). During the first contact, core symptoms and beliefs of our client (without questioning these) are inventoried. Evaluating treatment of the symptomatology as perceived by the client requires an extended symptom inventory that covers core features of mental health problems as they might be presented to therapists at the secondary prevention stage.

The Core Symptoms Evaluation – ReAttach, referred to as CSE-R, is designed to meet the need to evaluate problem status presented by patients without full diagnostic assessment procedures. The questionnaire measures schema related beliefs and presented symptomatology and it reveals severe psychopathology and potential risky behaviour. Schema-related beliefs are included to help the therapist to understand countertransference in therapist-patient relationship and to investigate the effect of the maladaptive patterns on the patient's daily life functioning. At secondary prevention level, there is no further specification of the complaints yet. Considering the broad range of symptomatology that might be expected, the questionnaire needs to cover a wider range of symptomatology than the symptom questionnaire Korte Klachten Lijst (Lange, 2007).

Methodological accountability

Core Symptom Evaluation – ReAttach questionnaire

CSE-R is a self-report for adults with mental health problems and a questionnaire for parents of children with mental health problems. Completing the questionnaire takes about 20- 30 minutes.

The CSE-R consists of 34 items: 7 schema-related beliefs and 21 symptoms that are frequently reported during intake interviews of patients with mental health issues. Additionally, 6 symptoms were included to detect more severe psychopathology or risky behaviour: suicidal thoughts or attempts, self-harm, addiction, impulsivity, hearing voices, seeing things that are not there.

General Instruction: "Listed below are thoughts or problems that someone might experience. Will you fill in how much these thoughts or problems affect you? (or your child, if applicable?)"

Instruction schema-related beliefs: "Please fill in how much these thoughts affect you:"

Schema-related beliefs items:

1. If someone is kind to me, I assume that he/she must be after something
2. I don't fit in
3. No one really understands me
4. I feel that I might go crazy
5. I feel ugly
6. I worry about losing control of my actions
7. I can't tolerate other people telling me what to do

Instruction symptom items: "Please fill in how much the following problems affect you:" Symptom items:

8. Concentration Problems
9. Anxiety
10. Depression
11. Memory Problems
12. Physical Problems (without medical cause)
13. Irritability
14. Relationship Problems
15. Suicidal thoughts or – attempts
16. Mood swings
17. Eating disorders
18. (Tendency towards) Self Destructive Behaviour
19. Sleeping Problems
20. Sexual Problems

21. Addictions
22. Confusion
23. Flashbacks or traumatic experiences
24. Problems to complete tasks
25. Chaos
26. Impulsivity
27. Hyperactivity
28. Emotion Regulation Problems, hypersensitivity
29. Behaviour Problems
30. Overtired, run-down
31. Obsessions
32. Compulsive behaviour
33. Hearing voices in my head
34. Seeing things that are not there

All items are rated at a 5 points scale:
0 = Not
1 = A bit
2 = Clearly affected
3 = Much
4 = Very much

The sum of scores on items 15, 18, 21, 26, 33 and 34 (suicidal, self-harm, impulsivity, addiction, voices, seeing things) is categorized as Risky Behaviour. This category has a signalling function, it is not a sub-scale. The questionnaire is filled in online and results are processed anonymously. Informed consent and instructions are obtained by the therapist. Extra information about the practical research is provided online before the start of the questionnaire: "By joining the pre- and post-measurements you will participate in the practical research of ReAttach. Your data will be processed anonymously".

Internal consistency

For the determination of the internal consistency the data from 3 groups is used:

Group 1 is the normative population N=62, male 32.26%, age M=40.45, SD=16.22, range=7-74. Group 2 is a patient group N=727, male 32.74 %, age M=39.55, SD=17.61, range=5-94. Group 3 can be described as a diverse group N=598, male 30.77%, age M=40.22, SD=16.90, range=5-94. This group consist of both patients and individuals from the general population. Internal consistency of the items was measured (Cronbach's alpha) and whether the different items make a positive contribution to the scale was examined by means of corrected item-total correlations (alfa>0.20, (Brink, 1998). **Table 4.2** presents the

results of the internal consistency and corrected item-total correlations of group 1, 2 and 3.

Table 4.2. *Internal consistency and corrected item-total correlations CSE-R*

		Normative	Patients	Diverse
	CSE-R	N=62	N=727	N=598
	Cronbach's alfa	0.85	0.92	0.93
a	**Schema-related beliefs**			
	Corrected item total correlation			
1	Mistrust / Abuse	.30	.48	0.52
2	Social Isolation	.49	.54	0.55
3	Not Understood	.47	.60	0.61
4	Loose Mind	.21	.64	0.65
5	Ugly	.28	.54	0.53
6	Loose Self Control	.38	.63	0.65
7	Domination	.48	.38	0.40
		Normative	**Patients**	**Diverse**
b	**Symptomatology**	N=62	N=727	N=598
	Corrected item total correlation			
8	Concentration	.28	.51	0.51
9	Anxiety	.55	.57	0.62
10	Depression	.47	.67	0.66
11	Memory problems	.47	.47	0.47
12	Somatic problems	.25	.41	0.44
13	Irritation	.36	.58	0.62
14	Relational problems	.40	.46	0.46
15	Suicidal thoughts or -attempts	.25	.47	0.47
16	Mood swings	.66	.64	0.67
17	Eating disorders	.20	.39	0.41
18	Self-Harm	.34	.39	0.41
19	Sleeping problems	.31	.43	0.46
20	Sexual problems	**.11**	.38	0.40
21	Addiction	**-0,01**	.39	0.39
22	Confusion	.45	.65	0.69
23	PTS related problems	**.09**	.50	0.54
24	Task completion problems	.45	.45	0.54
25	Chaos	.45	.62	0.63
26	Impulsivity	.50	.43	0.44
27	Hyperactivity	.44	.38	0.39
28	Emotion regulation problems	.56	.58	0.61
29	Behavioural problems	.20	.51	0.54
30	Fatigue	.40	.53	0.53
31	Obsessions	.32	.61	0.66
32	Compulsive behaviour	.29	.38	0.38
33	Hearing voices	**NaN**	.27	0.28
34	Seeing things	.34	.28	0.27

All groups show a good internal consistency of resp. 0.85, 0.92 and 0.93. In the normative group, for the items sexual problems, addiction, PTS-related problems and hearing voices, correlations are measured below .20 and therefore these items might not be contributing positively at the total questionnaire. These items present symptomatology that is not common in the general population. The larger samples of group 2 (patients) and group 3 (divers) show all item-total correlations >.20.

The 34 items of the questionnaire give a coherent indication for the schema-related beliefs and symptomatology.

Test-retest data: reliability and retest effect correction

Test-retest reliability has been studied in 2 groups. In the first study 46 patients participated and filled in the pre-test twice before their first ReAttach session. Group 1 included 34.78% male, age M=38.09, SD=16.78, range=9-69. In the second study 62 individuals from the general population filled in the questionnaire twice with an interval of one week. Group 2 included 32.26% male, age M=40.45, SD=16.22, range=7-74. Pearson-correlations of both studies are presented in **table 4.3**.

Table 4.3. *Test-retest reliability CSE-R and KKL*

	Normative Group N=62	Patient Group N=46
Test-retest reliability CSE		
Pearson Correlation CSE1-CSE2	0.88	0.91
Significance	0.000	0.000
Test-retest reliability KKL		
Pearson Correlation KKL1-KKL2	0.83	0.86
Significance	0.000	0.000

No rest-retest effect is found for CSE-R in both studies as displayed in **table 4.4**. For the patient group a test-retest effect is found for KKL. The difference of 1.43 is 20% of SD1 (7.08). This test-retest effect is known for this questionnaire (Lange, 2007). Changes smaller than 20% of the standard deviation of the mean pre-test are not reliable due to this effect.

Table 4.4. *Test-retest effect CSE-R and KKL*

Normative Group N=62	**M1, SD1**	**M2, SD2**	**M1-M2**	**Sign (2-tailed)**
Test-retest mean CSE-scores	15.24, 9.79	15.42, 10.55	-0,18	0.785
Test-retest mean KKL-scores	5.89, 3.72	5.94, 4.14	-0,05	0.872
Patient Group N=46	**M1, SD1**	**M2, SD2**	**M1-M2**	**Sign (2-tailed)**
Test-retest mean CSE-scores	53.04, 21.43	51.78, 22.12	1.26	0.370
Test-retest mean KKL-scores	20.24, 7.08	18.80, 7.82	1.43	0.020

Relation with biographical variables

The relation with biographical variables has been studied in two groups. Group 1 included 520 patients, male 30.77%, age M=40.10, SD 16.94, range=5-94. Group 2 included both patients and normative population N=598, male 30.77%, age M=40.22, SD=16.90, range=5-94. **Table 4.5** presents the Pearson-correlations of both groups with age and gender. No significant correlations were found in both groups.

Table 4.5. *Pearson-correlations CSE-R and KKL with age and gender*

CSE-R and KKL		
Biographical Variables	**Study 1**	**Study 2**
Pearson correlations	**Patients N=727**	**Diverse N=598**
CSE-R correlation with Age	**-0,11**	-0,07
Significance	**0.002**	0.105
CSE-R correlation with Gender	-0,04	0.01
Significance	0.269	0.736
KKL-correlation with Age	-0,01	0.02
Significance	0.711	0.628
KKL-correlation with Gender	-0,03	**-0,08**
Significance	0.489	**0.046**

Validity

CSE-R is meant to be a symptom inventory questionnaire for individuals with mental health problems.

Concurrent validity

To determine the concurrent validity, correlations of total CSE-R and KKL-scores were measured in 3 groups. Group 1 consists of individuals from the normative population, N=62, 32.26% male, age M=40.45, SD=16.22, range=7-74. Group 2 included 727 patients, male 32.74 %, age M=39.55, SD=17.61, range=5-94. Group 3 included both patients and general population N=598, male 30.77%, age M=40.22, SD=16.90, range=5-94. Positive high Pearson correlations were found in all groups: .89, (p=0.000), .91, (p=0.000), and .91 (p=0.000). The total CSE-R score is likely to measure much the same as the total score of the KKL: psychological distress (Lange, 2007).

Construct validity

The KKL total score has a strong correlation with negative cognitive biases and a moderate to strong negative correlation with positive psychological features as the experience of happiness (Lange, 2007). To investigate the construct validity of the CSE-R Pearson correlations are determined with happiness and pain by single-items I feel happy (rated 0 – 4), and How much did pain affect your daily activities? (0-4). Pearson Correlation of both KKL total scores, CSE-R total scores and happiness were measured in a sample of 598 diverse population, male 30.77%, age M=40.22, SD=16.90, range=5-94. The intercorrelation with Pain has been examined in a diverse group N=351, age m=39.42, SD=18.91, range=5-max94. Results presented in table 6 show that negative correlations were found for both KKL-total score and CSE-R total score in relation with happiness and positive correlations were found for both KKL and CSE-R total scores in relation with pain.

Table 4.6. *Pearson-correlations psychological distress (measured by KKL and CSE-R) and other variables*

Pearson Correlation of Psychological Distress with other variables	Happiness Diverse N=598	Pain Patients N=351
KKL total score	-0,46	0,38
Significance	0.000	0.000
CSE-R total score	-0,47	0.36
Significance	0.000	0.000

Criterion validity

For the normative group (N=62,) 32.26% male, age M=40.45, SD=16.22, range=7-74, mean total score on the CSE-R is 20.29, SD=13.70. The mean total score on CSE-R in the patient group (N=727, male 32.74 %, age M=39.55, SD=17.61, range=5-94) is 44.69, SD=21.28.

Quantification of severity of problems

The CSE-R is meant to be used for a wide range of patients seeking help from secondary prevention level till the level of psychiatric treatment. Standards are determined in relation with the normative population group (N=62) by Normative Deviation Scores (Van Yperen, 2008). **Table 4.7** presents the framework for interpretation (Van Yperen 2008) .

Table 4.7. *Framework of interpretation of CSE-R total scores*

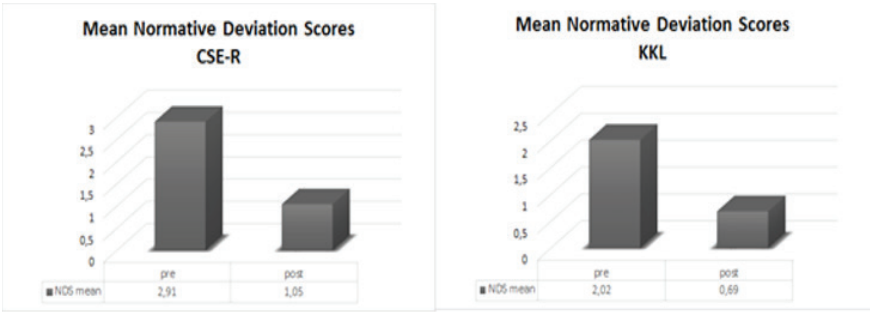
Interpretation of CSE-R scores in terms of Normative Deviation	**CSE-R total score**	**NDS**	**Percentile**
Very serious problems	> 34	>1.96	>97
Serious problems	31-34	1.65-1.96	95-97
Substantial problems	28-30	1.29-1.64	90-94
Moderate problems	26-28	1.00-1.28	84-89
No problems	<26	<1.00	<84

Normative group (N=62)	32.26% male, age M=40.45, SD=16.22, range=7-74
CSE-R mean score 15.24, SD 9.79	
Patient group (N=727)	
CSE-R mean score 43.81, SD 8.48	male 32.74 %, age M=39.55, SD=17.61, range=5-94

The normative group (N=62) filled out the KKL as well and mean KKL-score of 5.89 is found with a standard deviation of 3.72. The KKL standards are based on a general population group (N=982) with a mean KKL-score of 6.5 and standard deviation of 5.1. The normative group (N=62) indicates less severe problems than the general population group used for the standardization of the KKL. Compared to the mean score of the general population (N=982) of the KKL the deviation is -0,12.

Our patient group (N=727) presents a mean KKL-score of 16.78 and a standard deviation of 8.47. The mean standard KKL-score for psychiatric patients is 18.1 for male and 23.1 for females with standard deviations of resp. 9.2 and 10.5 (Lange, 2007). We start to work with the standards of our normative group and compare the results with the outcome if we use the KKL-standards to evaluate the results.

Figure 4.9. *Pre- to post treatment comparison of mean NDS-scores CSE-R and KKL patient group*



Pre- to post treatment comparison of mean NDS-scores for both questionnaires are presented in **figure 4.9**. Looking at the average presentation of the seriousness of the problems before treatment, mean NDS-scores indicate very serious problems both measured with CSE-R (NDS=2.91) and KKL (NDS=2.02). After 5 therapy sessions, average presentation of the seriousness of problems is moderate with CSE-R (NDS=1.05) and asymptomatic with KKL (NDS=0.69). This quantification of problem status is based on average presentation and gives no results in terms of numbers of patients related to the seriousness of the complaint.

Figure 4.10. *Quantification of severity of symptomatology measured with CSE-R and KKL*

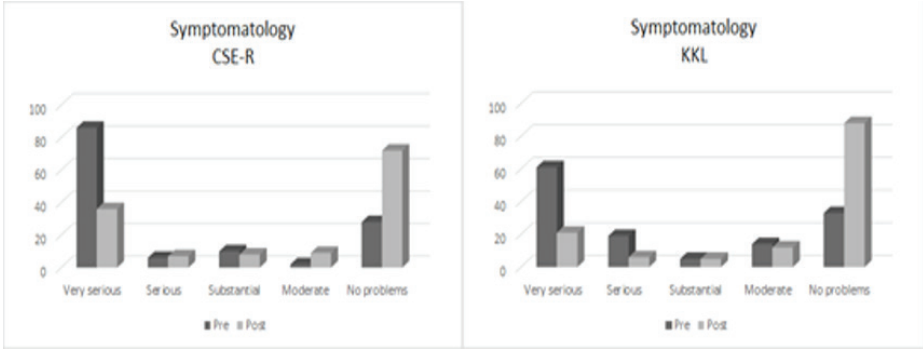


Figure 4.10 displays the number of patients suffering from very serious, serious, substantial, moderate or no problems before and after treatment with ReAttach. Before treatment 86 patients of our patient group (N=132) reported very serious problems with CSE-R, 6 serious problems,

10 substantial and 2 moderate problems. There were 28 patients whose symptoms could not be objectified by the CSE-R (NDS<1), but these patients signed up for therapy. After treatment 36 patients reported very serious problems, 7 serious problems, 8 substantial problems, 9 moderate problems and 72 patients did not report significant problems.

Measured with the KKL before treatment 61 patients reported very serious problems, 19 serious problems, 5 substantial, 14 moderate and 33 no significant problems. Measured with KKL after treatment 21 patients reported very serious problems, 6 serious problems, 5 substantial, 12 moderate and 88 did not report significant problems. A clear trend in decrease of problems is shown in both measurements.

Quantification of individual change

The interpretation of the difference between individual pre- and postscore can be evaluated in terms of reliable change. Scores beyond +1SD above the mean of the non-disturbed reference group (N=62) are disturbed, and below +1SD above the mean score of the normative group are defined as normal.

An individual who falls below this cut off score is viewed as having a successful outcome, as being "cured".

Method

For the normative group (N=62,) 32.26% male, age M=40.45, SD=16.22, range=7-74, mean total score on the CSE-R is 20.29, SD=13.70. The cut off score is 34.

The mean total score on CSE-R in the patient group (N=727, male 32.74 %, age M=39.55, SD=17.61, range=5-94) is 44.69, SD=21.28. Cronbach's alpha of the CSE-R measured with the patient group is 0.92. The standard error of measurement, due to the unreliability of the scale SEmeas = 4.98. The Reliable Change Index is measured by dividing the difference between pre- and post-test scores by 4.98 (SEmeas). If RCI is greater than 1.96 the difference is considered reliable and not expected due to the unreliability of the measure. A difference between pre- and post-test scores that is greater than 9.76 is a reliable change. Statistical summary of the data is displayed in **table 4.8**.

Table 4.8. *Reliable Change Index Summary Statistics*

RCI measurement 5 sessions ReAttach	Reliable deterioration		Uncertain change		Reliable improvement-not recovered		Reliable improvement-recovered		% moved from above cutoff score to below cutoff score	
Measure	n	%	n	%	n	%	n	%	n	%
CSE total N=132	0	0	47	35	43	33	42	32	45	34
Students N=65	0	0	28	43	23	35	14	22	15	23
Reg. Therapists N=67	0	0	19	28	20	30	28	42	30	45

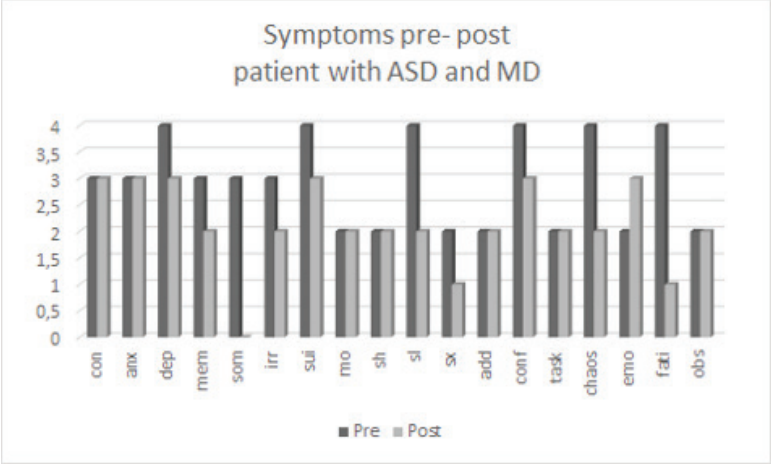
Results

No reliable deterioration is found. Uncertain change presents the population within the band of no reliable change. Reliable improvement – not recovered are those patients who showed reliable positive changes, however are not fully cured after 5 ReAttach sessions: the scores at post-test are still above the cut off score. Reliable improvement -recovered are those patients who show positive reliable changes and fully recovered symptom presentation at post-test. Out of 132 patients given ReAttach by students and registered therapists 42 fully recovered and 43 present positive reliable changes without full recovery. The percentage of patients for whom the 5 sessions of ReAttach was clearly beneficial is 65%. Out of 67 patients given ReAttach by registered therapists 28 fully recovered and how positive reliable changes without full recovery. The percentage of patients who benefit from the 5 sessions ReAttach given by the registered therapists is 72%, for students the percentage is lower 57%. The difference is understandable because the students did not yet pass their treatment integrity check.

Patient with Autism Spectrum Disorder and Major Depression

A female patient, 41 years old, diagnosed with Autism Spectrum Disorder and Major Depression presents the following symptoms at pre- and post-test as displayed in **figure 4.11**.

Figure 4.11. *Symptom presentation of patient with ASD and MD at pre- and post-test*



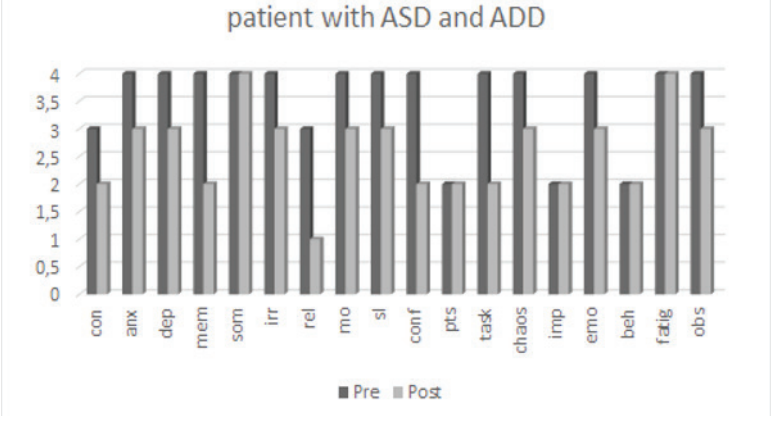
Total CSE-R scores are compared and the difference is interpreted in terms of reliable change.

Pre-test CSE-R score was 80 and post-test CSE-R score was 59. The difference of 21 a reliable improvement, however this patient is not fully recovered yet.

Patient with ASD and ADD

A 29-year-old female patient, diagnosed with ASD and Attention Deficit Disorder shows a decline of scores on several symptoms at post-test as displayed in figure 12 after 5 sessions of ReAttach.

Figure 4.12. *Pre- to post treatment comparison of scores of a patient with ASD and Attention Deficit Disorder*



The pre-test CSE-R score of 85 was reduced to a post score of 64. There is a reliable improvement but the patient is not fully recovered yet.

Core Symptom Evaluation from a network perspective

Method

To investigate the hypothesis that ReAttach is beneficial for a wide range of patients with mental health problems, comparison of mean total scores on KKL and CSE-R (after 5 ReAttach sessions) is conducted in a group of 132 patients (Male 30.30%, Age M=40.59, SD=16.62, 7-77.) Patient's flowchart of this study is presented in **figure 4.13**.

Results

Pre- to post treatment comparison of the average CSE-R-scores of all patients are presented in **table 4.9**. Effect Size (ES) is measured by dividing the difference of mean pre-score and mean post-score by polarized standard deviation (Van Yperen 2008) (Cohen, 1992).

Results indicate a significant decline of psychological distress measured with CSE-R. The ES of 1.01 is large (>0.80 (Cohen, 1992). There is a significant decline of psychological distress measured with KKL: the ES of 0.80 is large (>0.80 (Cohen, 1992).

Figure 4.13. *Patient's flow chart ReAttach study*

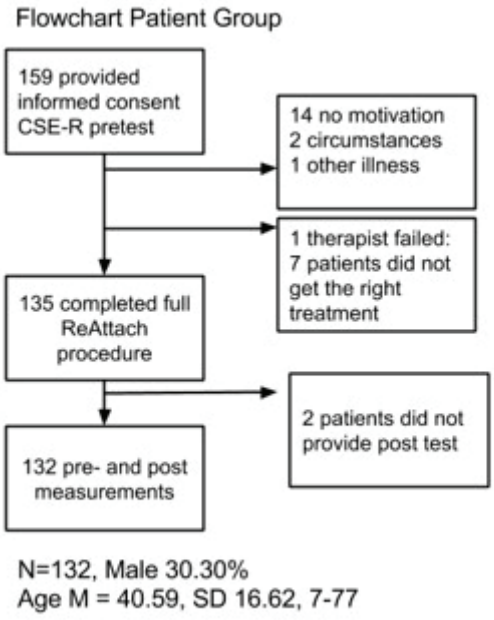


Table 4.9. *Pre- to post treatment comparison of mean CSE-R and KKL-scores of all patients (N=132)*

Total	Group	Male	Age M, SD	M1, SD	M2, SD	M1-M2	t (df) p	ES
CSE	N=132	30.30%	40.59, 16.62, 7-77	43.70, 19.88	25.49, 16.13	18.21	13.61(131), 0.000	1.01
KKL	N=132	30.30%	40.59, 16.62, 7-77	16.81, 7.55	9.99, 6.51	6.82	13.18(131), 0.000	0.80

Method

A network of symptoms "synchronizes" because of their underlying connections (Nuijten, 2016) and might hypothetically be used to predict

treatment outcome in case an intervention influences this symptomatology network. To investigate whether symptoms can be represented in a symptomatology network (Nuijten, 2016), bivariate correlations of symptoms are measured ($p<0.050$) for group A.

To investigate the hypotheses that ReAttach influences core symptomatology networks, pre- to post treatment comparison of mean scores on core presented symptomatology is conducted. Beliefs is found to have most connections and significant Pearson correlations ($p<0.05$) of Beliefs and symptomatology is presented in table 10 after selection of patients presenting the symptoms at pre-test (2,3 and 4-scores). For each symptom group characteristics and pre- to post treatment comparison of mean scores are presented in **table 4.10**.

Table 4.10. *Summary statistics of the core symptom network of all patients Beliefs Network (N=132)*

All Patients Beliefs NW Symptom	Pearson Corr Beliefs	Male	Age M, SD	M1, SD	M2, SD	M1-M2	t (df) p	ES
Beliefs	1	30.30%	40.59, 16.62, 7-77	9.75, 5.49	5.72, 4.47	4.03	9.67(131), 0.000	0.80
Conc	.30	33.33%	40.51, 16.80, 7-77	2.76, 0.75	1.77, 1.09	0.99	8.29(83), 0.000	1.05
Anx	.53	28.75%	40.31, 16.33, 8-77	2.80, 0.77	1.58, 1.12	1.23	10.50(79), 0.000	1.28
Dep	.58	31.82%	41.60, 15.76, 8-77	2.70, 0.76	1.31, 1.01	1.40	13.11(87), 0.000	1.57
Mem	.26	29.41%	42.22, 14.54, 7-77	2.65, 0.73	1.54, 1.16	1.10	8.76(67), 0.000	1.13
Som	.32	21.13%	41.64, 15.81, 9-77	2.77, 0.78	1.42, 1.17	1.35	10.51(70), 0.000	1.35
Irr	.39	27.96%	38.94, 15.99, 7-76	2.79, 0.70	1.59, 0.96	1.13	11.10(92), 0.000	1.35
Rel	.32	31.11%	43.42, 12.84, 18-75	2.53, 0.76	1.16, 1.02	1.38	9.18(44), 0.000	1.53
Sui	.46	27.78%	43.61, 12.85, 14-60	2.61, 0.78	0.83, 1.04	1.78	8.59(18), 0.000	1.93
Moo	.54	25.61%	42.52, 15.59, 7-77	2.51, 0.67	1.45, 0.94	1.06	9.75(81), 0.000	1.29
Eat	.25	30.00%	37.80, 13.64, 12-56	2.35, 0.49	1.15, 0.93	1.20	6.99(19), 0.000	1.62
SH	.30	50.00%	35.58, 16.08, 7-59	2.67, 0.65	0.83, 1.03	1.83	5.70(11), 0.000	2.13
SL	.22	25.00%	42.75, 15.86, 7-76	2.78, 0.79	1.53, 1.17	1.25	9.76(67), 0.000	1.26
Sx	.28	41.67%	45.75, 15.18, 7-75	2.79, 0.83	1.38, 1.13	1.42	5.90(23), 0.000	1.42
Add	.44	26.92%	45.42, 10.53, 17-63	2.65, 0.75	1.31, 1.29	1.35	7.34(25), 0.000	1.27
Conf	.50	30.00%	44.08, 14.35, 14-77	2.50, 0.68	1.24, 1.04	1.26	9.23(49), 0.000	1.43
PTS	.39	21.28%	43.94, 14.91, 12-77	2.66, 0.81	1.00, 1.10	1.66	9.60(46), 0.000	1.71
Task	.35	30.16%	40.19, 17.31, 7-76	2.67, 0.76	1.41, 0.94	1.25	9.51(62), 0.000	1.47
Chaos	.46	29.03%	39.18, 16.33, 7-77	2.63, 0.71	1.29, 0.95	1.34	11.90(61), 0.000	1.60
Impuls	.31	28.57%	40.63, 14.50, 7-63	2.52, 0.69	1.41, 0.97	1.11	8.93(55), 0.000	1.32
Hyper	.20	42.50%	38.92, 18.45, 7-75	2.58, 0.68	1.13, 0.94	1.45	7.95(39), 0.000	1.77
Emo	.50	28.00%	40.61, 16.11, 7-76	2.97, 0.80	1.72, 1.16	1.25	10.13(99), 0.000	1.26
Beh	.41	34.78%	34.13, 15.99, 7-59	2.26, 0.45	0.61, 0.84	1.65	9.53(22), 0.000	2.46
Fati	.35	23.60%	41.24, 15.13, 10-77	2.88, 0.85	1.71, 1.25	1.17	10.32(88), 0.000	1.09
Obs	.52	30.36%	43.66, 15.08, 7-77	2.82, 0.81	1.29, 1.19	1.54	11.83(55), 0.000	1.54
Comp	.17	50.00%	35.93, 17.80, 7-59	2.79, 0.80	0.57, 0.65	2.21	6.97(13), 0.000	3.03
Voi	.25	36.36%	46.27, 16.08, 10-59	2.55, 0.69	0.91, 1.45	1.64	4.50(10), 0.001	1.49
See	.20	37.50%	48.63, 13.22, 22-60	2.50, 0.76	1.25, 1.49	1.25	3.42(7), 0.011	1.06

Results

Considering beliefs and with beliefs connected symptoms a symptomatology network, comparison of pre- to post treatment average beliefs-scores and correlated symptomatology has been conducted with a paired T-test. Pre- to post treatment comparison of the average beliefs-scores and correlated symptoms are presented in table 10. Results show a significant decline of schema-related beliefs measured with CSE-R. The

ES of 0.80 is large (>0.80 (Cohen, 1992). Significant declines ($p<0.001$) of all correlated symptoms are found with large ES, varying from 1.06-3.03.

Conclusion

ReAttach is found to be very beneficial for patients with mental health issues as presented in this group of 132 patients with a wide range of symptomatology. The results further suggest that ReAttach might target a core symptomatology network in 5 sessions of ReAttach.

4.6. Core symptomatology networks

Anxiety from a network perspective

Introduction

Anxious individuals have a threat response that is not realistic. Perhaps they have lost the support of their social environment (Famitafreshi, 2016) or feel socially isolated which causes lots of stress. Individuals with ASD experience a lot of problems in their daily life functioning. The lack of coherency and unpredictability of life may cause anxiety. ReAttach decreases the anxiety of the patient by personal presentation and attitude of the therapist (voice, attitude) till the arousal is optimised to start the ReAttach session.

Method

To investigate the effect of 5 ReAttach sessions on a group of patients who present anxiety, out of the patients group (N=132), 80 patients with 2, 3 or 4 pre-test scores on anxiety are selected (male 28.75%, age M=40.31, SD=16.33, range=8-77). Pre-to post treatment comparison of the average CSE-R and KKL scores is shown in **table 4.11**.

To identify the core symptomatology network, intercorrelations of symptoms and total beliefs score are reviewed. Beliefs has most connections and significant Pearson correlations ($p<0.05$) of beliefs and symptomatology are presented in **table 4.11**. To filter out patients without symptoms, only patients presenting the symptoms at pre-test (2,3 and 4-scores) are selected for each symptom. Selection of patients presenting the symptoms at pre-test (2,3 and 4-scores) filters patients without symptoms. For each symptom group characteristics and pre- to post treatment comparison of mean scores are presented in **table 4.12**.

Table 4.11. *Pre- to post treatment comparison of mean CSE-R and KKL-scores of patients with anxiety*

Anxiety	Group	Male	Age M, SD	M1, SD	M2, SD	M1-M2	t (df) p	ES
CSE	N=80	28.75%	40.31, SD 16.33 8-77	51.40, 18.35	29.70, 16.99	21.70	12.34(79), 0.000	1.23
KKL	N=80	28.75%	40.31, SD 16.33 8-77	19.64, 6.91	11.64, 6.88	8.00	11.67(79), 0.000	1.16

Results

Pre- to post treatment comparison of the average CSE-R and KKL-scores are presented in **table 4.11**. There is significant decline of psychological distress measured with CSE-R. The ES of 1.23 is large (>0.80) (Cohen, 1992). Results show a significant decline of psychological distress measured with KKL. The ES of 1.16 is large.

A significant decline of schema-related beliefs is measured with CSE-R. The ES of 0.95 is large. Significant declines ($p<0.001$) of all correlated symptoms are found with large ES, varying from 0.95-2.15.

Table 4.12. *Summary statistics of the core symptom network of patients with anxiety (N=80)*

Anx Pres. Beliefs NW Symptom	Pearson Corr Beliefs	Male	Age M, SD	M1, SD	M2, SD	M1-M2	t (df) p	ES
Beliefs	1.00	28.75%	40.31, 16.33, 8-77	11.70, 5.43	6.83, 4.83	4.88	8.53(79), 0.000	0.95
Conc	.26	32.14%	41.82, 15.49, 10-77	2.79, 0.79	1.66, 1.03	1.13	7.80(55), 0.000	1.25
Dep	.55	30.77%	41.80, 15.08, 8-77	2.82, 0.77	1.40, 1.00	1.42	11.61(64), 0.000	1.60
Mem	.23	26.67%	42.00, 14.05, 10-77	2.69, 0.76	1.62, 1.13	1.07	7.09(44), 0.000	1.11
Som	.27	18.37%	42.63, 15.09, 10-77	2.84, 0.77	1.47, 1.21	1.37	9.25(48), 0.000	1.36
Irr	.30	25.42%	38.14, 15.35, 8-76	2.86, 0.71	1.75, 0.96	1.12	9.06(58), 0.000	1.33
Rel	.35	19.35%	42.26, 12.36, 21-63	2.52, 0.72	1.16, 0.93	1.35	7.66(30), 0.000	1.63
Sui	.47	31.82%	44.09, 12.57, 18-60	2.18, 0.91	0.68, 0.84	1.50	6.95(21), 0.000	1.70
Moo	.47	26.67%	42.15, 15.41, 8-77	2.62, 0.72	1.52, 0.98	1.10	8.09(59), 0.000	1.28
SH	.28	55.56%	43.22, 9.30, 26-59	2.78, 0.67	0.89, 1.05	1.89	4.46(8), 0.002	2.15
Sx	.27	36.84%	45.53, 12.48, 23-75	2.79, 0.85	1.53, 1.07	1.26	4.44(18), 0.000	1.30
Add	.38	35.00%	46.65, 9.93, 23-63	2.80, 0.77	1.65, 1.27	1.15	5.51(19), 0.000	1.10
Conf	.40	26.19%	43.29, 13.72, 14-77	2.50, 0.71	1.26, 1.08	1.24	8.16(41), 0.000	1.36
PTS	.25	22.86%	44.46, 13.68, 21-77	2.71, 0.86	1.14, 1.17	1.57	7.62(34), 0.000	1.54
Task	.31	29.55%	40.70, 16.52, 10-76	2.73, 0.79	1.34, 0.89	1.39	9.99(43), 0.000	1.67
Chaos	.45	24.39%	41.44, 14.62, 10-77	2.78, 0.72	1.39, 0.95	1.39	9.16(40), 0.000	1.65
Impuls	.23	30.56%	41.06, 13.68, 14-63	2.58, 0.69	1.42, 0.97	1.17	7.21(35), 0.000	1.39
Emo	.41	25.71%	40.49, 15.90, 8-76	3.07, 0.80	1.83, 1.22	1.24	8.28(69), 0.000	1.20
Beh	.24	27.78%	36.89, 14.34, 10-59	2.22, 0.43	0.67, 0.91	1.56	7.71(17), 0.000	2.20
Obs	.46	29.27%	44.02, 13.70, 18-77	2.88, 0.84	1.39, 1.18	1.49	9.50(40), 0.000	1.46
Anx	.31	28.75%	40.31, 16.33, 8-77	2.80, 0.77	1.58, 1.12	1.23	10.50(79), 0.000	1.28

Conclusion

Results indicate that ReAttach is beneficial for patients with anxiety symptoms and successfully targets a core symptomatology network in this patient group.

Compulsivity from a network perspective

Introduction

Overlapping symptomatology between ASD and Obsessive Compulsive Disorder (OCD) complicates differential diagnosis in the assessment of autism aspects in OCD population (Paula-Perez, 2013). Beyond symptom level research findings suggest underlying relations between OCD and ASD (Arildskov, 2015), (Bartz, 2006) (Jacob, 2009). Adult studies have shown lower OCD severity in adults with OCD and comorbid ASD compared to "pure" OCD (Cath, 2008), no differences in severity between OCD patients with or without autism aspects (Mito, 2014) or that autism aspects were associated with OCD severity (Anholt, 2010) (Arildskov, 2015).

In a study of which parents of 257 children and adolescents with OCD completed the Autism Spectrum Screening Questionnaire for OCD patients elevated rates of ASD symptoms in paediatric OCD population (Arildskov, 2015). Autism-specific symptoms, clearly distinct from OCD phenotype were frequently found among OCD patients.

ReAttach and compulsivity

According Mancini's cognitive model of OCD (Mancini, 2016) an event interpreted as a possible threat or personal mistake leads to a ritual, incantation or avoidance in an attempt to control the bad things that might happen. There is a detection of "something wrong" which might have negative consequences. No matter how small or subjective this is, the identification of this potential threat is enough to stress out due to our brain's tendency to worry. Besides this identification of a potential threat there are cognitive evaluations (beliefs) leaping towards worst-case-scenario conclusions and rising intensity of stress: terrifying prospects. In an attempt to regulate our emotions we desperately want to take control. When we believe that we can do something to stop these bad things (and emotions) from happening our social reward system will give us a big reward in terms of a good feeling. The instant relief that by washing your hands once you have prevented death (because if you didn't do that you might be contaminated) on top of the adrenaline of the fight-or-flight response will make you feel great! At the same time the event that has been identified as very dangerous will surely not be forgotten as it is important for us to remember danger to survive. Patients with OCD may end up in a vicious circle of recognizing this labelled danger and immediately end up doing whatever they believe that makes this danger go away. In their reality this is vitally important. There is a heightened awareness, focus and sensitivity for similar future dangerous events.

Eventually stuck in patterns of compulsions for patients who suffer

from compulsivity, the compulsivity itself can be regarded as a threat. The patient feels a lack of control and therefore we include the compulsion in the ReAttach protocol as a significant other. By the prompt of affective mentalization the patient regains control.

Method

To investigate the hypothesis that ReAttach is beneficial for patients with compulsivity, out of the patients group (N=132),14 patients with 2, 3 or 4-pre-test scores on compulsivity are selected (male 50%, age M=35.93, SD=17.80, range=7-59). Pre-to post treatment comparisons of the average CSE-R and KKL scores are shown in Table 13.

Table 4.13. *Pre- to post treatment comparison of mean CSE-R and KKL-scores of patients with compulsivity*

Compulsivity	Group	Male	Age M, SD	M1, SD	M2, SD	M1-M2	t (df) p	ES
CSE	N=14	50.00%	35.93, 17.80, 7-59	61.21, 15.20	31.14, 19.43	30.07	7.75(13), 0.000	1.72
KKL	N=14	50.00%	35.93, 17.80, 7-59	22.00, 6.30	11.36, 6.74	10.64	8.17(13), 0.000	1.63

To identify the core symptomatology networks, intercorrelations of symptoms and total beliefs score are reviewed. Hyperactivity and Voices have most connections and significant Pearson correlations of Hyperactivity and Voices and other symptoms are presented in **table 4.13**. To filter out patients without symptoms, only patients presenting the symptoms at pre-test (2,3 and 4-scores) are selected for each symptom. For each symptom group characteristics and pre- to post treatment comparison of mean scores are presented in **table 4.14**.

Table 4.14. *Summary statistics of the core symptom networks of patients with compulsivity*

Comp Present Hyper NW Symptom	Pearson Corr. Hyper	Male	Age M, SD	M1, SD	M2, SD	M1-M2	t (df) p	ES
Hyper	1	66.67%	45.00, 19.69, 7-59	2.83, 0.75	1.33, 0.82	1.50	6.71(5), 0.001	1.90
SI	.70	40.00%	36.70, 20.42, 7-59	2.90, 0.84	1.30, 1.49	1.60	4.00(9), 0.003	1.36
PTS	.58	50.00%	45.25, 16.00, 20-59	3.00, 0.93	1.13, 1.36	1.88	4.25(7), 0.004	1.62
Obs	.56	50.00%	41.90, 17.37, 7-59	3.20, 0.63	1.80, 1.55	1.40	3.28(9), 0.010	1.19
Voi	.68	40.00%	47.80, 15.67, 22-59	2.60, 0.55	1.00, 1.41	1.60	ns	ns
Comp	**ns**	50%	35.93, 17.80, 7-59	2.79, 0.80	0.57, 0.65	2.21	6.97(13), 0.000	3.03
Comp Present Voi NW Symptom	**Pearson Corr. Voices**	**Male**	**Age M, SD**	**M1, SD**	**M2, SD**	**M1-M2**	**t (df) p**	**ES**
Voices	1	40.00%	47.80, 15.67, 22-59	2.60, 0.55	1.00, 1.41	1.60	ns	ns
Sleep	.68	40.00%	36.70, 20.42, 7-59	2.90, 0.84	1.30, 1.49	1.60	4.00(9), 0.003	1.36
PTS	.71	50.00%	45.25, 16.00, 20-59	3.00, 0.93	1.13, 1.36	1.88	4.25(7), 0.004	1.62
Hyper	.68	66.67%	45.00, 19.69, 7-59	2.83, 0.75	1.33, 0.82	1.50	6.71(5), 0.001	1.90
Fatigue	.65	46.15%	38.15, 16.37, 14-59	2.85, 0.90	1.62, 1.26	1.23	4.79(12), 0.000	1.13
Compulsivity	**ns**	50.00%	35.93, 17.80, 7-59	2.79, 0.80	0.57, 0.65	2.21	6.97(13), 0.000	3.03

Results

Pre- to post treatment comparison of the average CSE-R and KKL-scores are presented in **table 4.13**. There is significant decline of psychological distress measured with CSE-R. The ES of 1.72 is large (>0.80) (Cohen, 1992). Results show a significant decline of psychological distress measured with KKL. The ES of 1.63 is large.

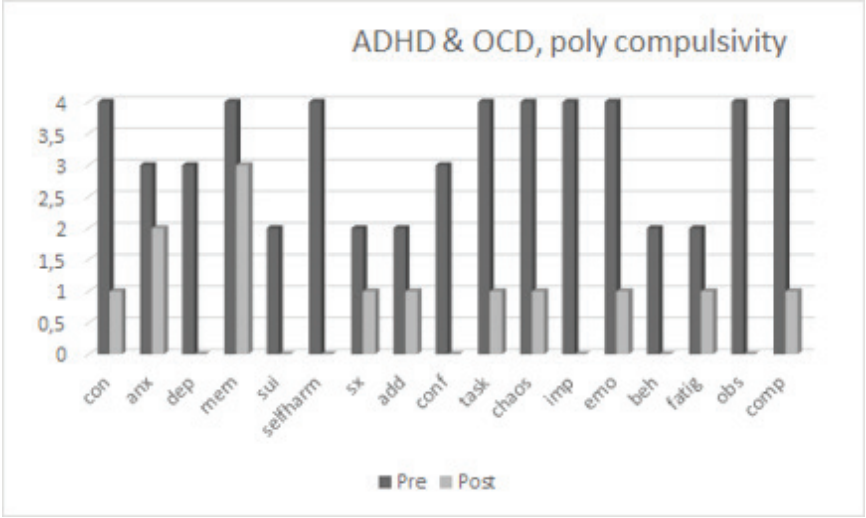
Presented in **table 4.14**, a significant decline of hyperactivity is measured with CSE-R. The ES of 1.90 is large. Significant declines ($p<0.001$) of all correlated symptoms are found with large ES, varying from 1.19-3.03 with exception of voices of which no significant change could be objectivated, probably due to the small number of 5 patients. No significant decline of voices is measured with CSE-R. Significant declines ($p<0.001$) of all correlated symptoms with voices are found with large ES, varying from 1.13-3.03.

A single case result

A case result is described shortly in terms of diagnose, symptom presentation and measured treatment outcome after 5 sessions ReAttach.

A male patient, 35 years old is diagnosed with ADHD and OCD and suffering from poly compulsivity at pre-test. Presented symptom scores on CSE-R are displayed in figure 14. Pre-test scores CSE-R 68 and KKL 26. Post-test scores CSE-R 16 and KKL 10. Reliable improvements with full recovery are measured with both questionnaires.

Figure 4.14. *Symptom presentation of patient with ADHD and OCD*



Conclusion

Preliminary results suggest that ReAttach is beneficial for patients with compulsivity. This study further suggests that ReAttach might target core symptomatology networks in patients with compulsivity, with restraint evaluation of effect sizes due to the small number of 14 patients. A single case result with poly-compulsivity has a positive treatment outcome, which is interesting.

Emotion Regulation from a network perspective

Introduction

Research of social cognition in Autism Spectrum Disorder and Personality Disorders conducted by (Duijkers, 2014) did not confirm their expectation that individuals with ASD function more impaired than individuals with PD on reading and regulating emotions (Duijkers, 2014).

External locus of control (Lefcourt, 1992) mighty be responsible for the instability of individuals with Personality Disorders such as Borderline Personality Disorder. Patients with Personality Disorders often complain that they feel out of control, which corresponds to the work of Lefcourt and Seifer, who found that the tendency to reflect negatively on own functioning may result in feeling less control and lower wellbeing (Lefcourt 1992) (Seifer 1992). Patients with Borderline, Avoidant and Dependent Personality Disorders tend to criticize themselves and have negative emotional responses, combined with low solution focused strategies, including emotion regulation (Arntz, 2011).

Therapeutic biases about the changeability of the clinical symptoms might determine the beliefs of the patients. It is quite interesting that ASD is generally seen as a chronic disorder, while PD is currently seen as a treatable condition with therapies focussing on cure rather than care (Duijkers, 2014) (Young, 2003).

ReAttach for patients with external locus of control

ReAttach directly influences the externalization and instability by the affective mentalization prompt. External locus of control is regarded as an important threat perception. Externalization as a symptom is treated as an 'inflammatory person' to create the opportunity for the patient to relate with it and to identify with it.

In some patients the differentiation between the self and others has not been developed as it should have been because of interpersonal relation problems at an early age. This symbiosis and boundlessness results in a dilemma that causes a lot of emotional stress and mental instability. The distance of significant others provides literally the physical space

and autonomy that is required to explore the world and to feel a sense of self, but at the same time there is the craving for belonging in an intimate relationship that cannot be felt in the absence of the significant others. CBM1 facilitates the patient to experience a mild and compassionate attitude towards a separate self and unspecified others.

Pro-active coping can be experienced and integrated in CBM2 to activate the shift from external locus of control and dependency towards feeling in control, self-responsible and autonomous.

Method

To investigate the effect of 5 ReAttach sessions on a group of patients with emotion regulation problems, out of the patients group (N=132),100 patients with 2, 3 or 4 pre-test scores on emotion regulation problems are selected (male 28%, age M=40.61, SD=16.11, range=7-76). Pre-to post treatment comparisons of the average CSE-R and KKL scores are shown in **table 4.15**.

To identify the core symptomatology network, intercorrelations of symptoms and total beliefs score are reviewed. Confusion has most connections and significant Pearson correlations ($p<0.05$) of confusion and symptomatology are presented in table 15. To filter out patients without symptoms, only patients presenting the symptoms at pre-test (2,3 and 4-scores) are selected for each symptom. For each symptom group characteristics and pre- to post treatment comparison of mean scores are presented in table 16.

Table 4.15. *Pre- to post treatment comparison of mean CSE-R and KKL-scores of patients with emotion regulation problems*

Emotion	Total Group							
CSE	N=100	28.00%	40.61, 16.11, 7-76	48.95, 18.80	28.26, 16.79	20.69	13.16(99), 0.000	1.16
KKL	N=100	28.00%	40.61, 16.11, 7-76	18.46, 7.38	11.02, 6.70	7.43	12.14(99), 0.000	1.05

Results

Pre- to post treatment comparison of the average CSE-R and KKL-scores are presented in **table 4.15**. There is significant decline of psychological distress measured with CSE-R. The ES of 1.16 is large. Results show a significant decline of psychological distress measured with KKL. The ES of 1.05 is large.

A significant decline of confusion is measured with CSE-R as shown in **table 4.16**. The ES of 1.49 is large. Significant declines ($p<0.001$) of all with confusion correlated symptoms are found with large ES, varying from 0.88-3.09.

Table 4.16. *Summary statistics of core symptom network of patients with emotion regulation problems*

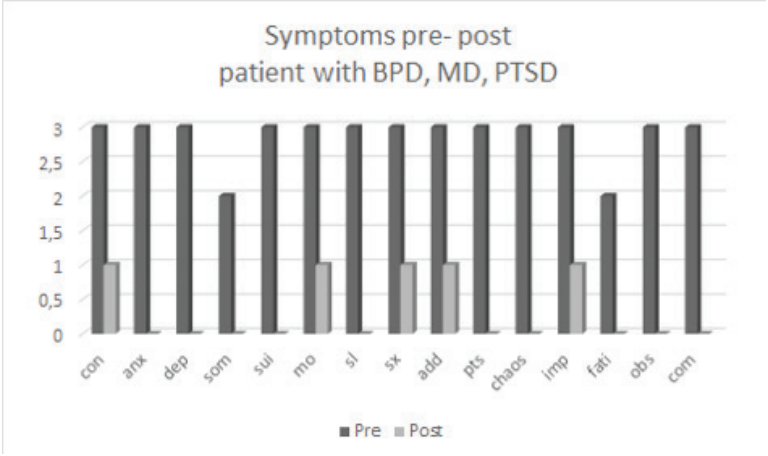
Emo Pres. Conf. NW Symptom	Pearson Corr Conf	Male	Age M, SD	M1, SD	M2, SD	M1-M2	t (df) p	ES
Conf	1	26.67%	42.64, 13.67, 14-75	2.49, 0.66	1.18, 1.05	1.31	8.83(44), 0.000	1.4
Bel	.48	28.00%	40.61, 16.11, 7-76	10.98, 5.48	6.45, 4.71	4.53	9.12(99), 0.000	0.8
Conc	.35	30.30%	40.76, 15.97, 7-75	2.74, 0.75	1.77, 1.09	0.97	7.94(65), 0.000	1.0
Anx	.42	25.71%	40.49, 15.90, 8-76	2.81, 0.77	1.69, 1.11	1.13	9.39(69), 0.000	1.1
Dep	.38	32.00%	40.28, 15.20, 8-75	2.77, 0.76	1.35, 0.99	1.43	12.33(74), 0.000	1.6
Mem	.53	28.07%	42.02, 13.69, 7-75	2.61, 0.75	1.51, 1.14	1.11	8.10(56), 0.000	1.1
Som	.26	15.52%	41.02, 14.43, 10-76	2.84, 0.79	1.40, 1.20	1.45	10.07(57), 0.000	1.4
Rel	.27	23.68%	43.39, 12.99, 18-75	2.63, 0.79	1.26, 1.03	1.37	8.03(37), 0.000	1.4
Sui	.34	29.41%	42.82, 12.79, 14-60	2.59, 0.80	0.88, 1.05	1.71	8.29(16), 0.000	1.8
Moo	.36	23.29%	41.89, 15.04, 7-76	2.53, 0.69	1.48, 0.94	1.05	9.43(72), 0.000	1.2
Sl	.34	25.45%	43.36, 16.72, 7-76	2.89, 0.79	1.56, 1.23	1.33	9.33(54), 0.000	1.2
Sx	.29	45.00%	45,75, 16.39, 7-75	2.80, 0.89	1.50, 1.15	1.30	4.77(19), 0.000	1.2
Add	.32	25.00%	44.75, 10.65, 17-63	2.63, 0.77	1.33, 1.34	1.29	6.63(23), 0.000	1.1
PTS	.39	21.95%	42.68, 13.17, 18-68	2.66, 0.82	1.05, 1.14	1.61	8.73(40), 0.000	1.6
Task	.34	28.85%	41.02, 17.20, 7-76	2.71, 0.78	1.33, 0.96	1.38	10.05(51), 0.000	1.3
Chaos	.43	25.00%	38.23, 15.19, 7-63	2.67, 0.71	1.33, 0.96	1.35	10.99(51), 0.000	1.6
Impuls	.39	27.08%	40.04, 14.93, 7-63	2.52, 0.71	1.44, 1.03	1.08	7.97(47), 0.000	1.0
Hyper	.28	41.67%	39.67, 18.59, 7-75	2.56, 0.65	1.00, 0.89	1.56	8.24(35), 0.000	2.0
Beh	.24	31.82%	34.27, 16.35, 7-59	2.23, 0.43	0.50, 0.67	1.73	10.56(21), 0.000	3.0
Fat.	.26	23.29%	41.11, 15.02, 10-76	2.93, 0.84	1.75, 1.24	1.18	9.28(72), 0.000	1.1
Obs	.43	30.00%	43.28, 14.36, 7-75	2.84, 0.82	1.36, 1.21	1.48	10.52(49), 0.000	1.4
Voi	.22	36.36%	46.27, 16.08, 10-59	2.55, 0.69	0.91, 1.45	1.64	4.50(10), 0.001	1.4
See	.23	28.57%	50.14, 13.51, 22-60	2.57, 0.79	1.43, 1.51	1.14	2.83(6), 0.030	0.9
Emo	.35	28.00%	40.61, 16.11, 7-76	2.97, 0.80	1.72, 1.16	1.25	10.13(99), 0.000	1.2

A single case-study

A female patient, 57 years diagnosed with Borderline Personality Disorder, Major Depression and Post Traumatic Stress Disorder participated in 5 ReAttach sessions of a therapist in training. Figure 15 represents the pre-post test scores on the symptomatology presented at the pre-test of the CSE-R.

Pre-test scores CSE-R 63 and KKL 25. Post-test scores CSE-R 11 and KKL 7. Reliable improvements without full recovery are measured with both questionnaires.

Figure 4.15. *Comparison of pre- and postscores of patient with BPD, MD and*



PTSD

Conclusion

Results indicate that ReAttach is beneficial for patients with emotion regulation problems and successfully targets a core symptomatology network in this patient group.

Hearing voices from a network perspective

Introduction

According (Cardella, 2015), Stanghellini and Ballerini noted that individuals with schizophrenia try to elaborate methods to understand people. They describe that their patients often endorsed a mechanistic and in some way mathematizable conceptualization of social intercourse (Stanghellini, 2011a) (Stanghellini, 2011b). This shows a lot of overlap with the mono-information processing of individuals with ASD. Indeed, dysfunction in temporal processing of multisensory stimuli have been shown in individuals with autism (Baum S.H., 2015) (Bebko, 2006) (De Boer Schellekens, 2013) (Foss Feig, 2010) (Kwakye, 2011) (Stevenson, 2014a.) (Wallace, 2014), but also in schizophrenia (Martin, 2013) The work of Cardella and Gangemi (Cardella, 2015) about reasoning in schizophrenia, shines a more optimistic light on the outcome of patients with schizophrenia. A cognitive perspective on the "lack of logic reasoning" seems to be heading more in the direction of psychiatric symptomatology than a defect.

ReAttach for patients with hallucinations

Our brain will decide what's real or not based on our personal experiences and concepts of reality: we have a mental model of how the world is supposed to work. Information that doesn't fit in this personal mental model will be rejected, suppressed or ignored so we can function without being disturbed by these "errors".

We find it very normal that we have the ability to distinguish internal sensory information with sensory information coming from outside. This functionality that we rely on every day requires a complex and delicate system of multiple areas in the brain acting together processing this sensory information (Allen, 2008). When the brain loses track of internal and external sensory information processing, this may result in hearing voices or seeing things that are not there (Allen, 2008). In case of auditory hallucinations it doesn't matter if voices represent a first-person (hearing your own thoughts as if they're *spoken by someone else*), a second person

(hearing someone talking *to* you) or third person (hearing one or more voices talking *about* you): the patient doesn't feel in control of this sensory information that is being processed as coming from *outside*. Hallucinations are regarded to be perceived from an external locus of control and therefore we include the hallucinations in the ReAttach protocol as a significant other. Patients identify with the hallucinations by the prompt of affective mentalization so they can moderate their emotions and (re) gain internal locus of control.

Method

To investigate the effect of 5 ReAttach sessions on a group of patients who suffer from hearing voices, out of the patients group (N=132), 11 patients with 2, 3 or 4 pre-test scores on hearing voices are selected (male 36.36%, age M=46.27, SD=16.08, range=10-59). Pre-to post treatment comparison of the average CSE-R and KKL scores is shown in **table 4.17**.

To identify the core symptomatology network, intercorrelations of symptoms and total beliefs score are reviewed. Depression has most connections and significant Pearson correlations ($p<0.05$) of depression and symptomatology are presented in table 20. To filter out patients without symptoms, only patients presenting the symptoms at pre-test (2,3 and 4-scores) are selected for each symptom. Selection of patients presenting the symptoms at pre-test (2,3 and 4-scores) filters patients without symptoms. For each symptom group characteristics and pre- to post treatment comparison of mean scores are presented in **table 4.18**.

Table 4.17. *Pre- to post treatment comparison of mean CSE-R and KKL-scores patients hearing voices*

Voices	Group							
CSE	N=11	36.36%	46.27, 16.08, 10-59	67.55, 14.69	44.36, 14.83	23.18	4.63(10), 0.001	1.57
KKL	N=11	36.36%	46.27, 16.08, 10-59	24.27, 5.59	16.82, 6.46	7.45	3.17(10), 0.010	1.23

Results

Pre- to post treatment comparison of the average CSE-R and KKL-scores are presented in table 17. A significant reduction of psychological distress is measured with CSE-R. The ES of 1.57 is large.

Results show a significant decline of psychological distress measured with KKL. The ES of 1.23 is large. A significant decline of depression is measured with CSE-R as shown in **table 4.18**. The ES of 1.21 is large. Significant declines ($p<0.001$) of correlated symptoms with depression are found with moderate to large ES, varying from 0.60-1.76 with exception of the score of memory problems that is not significant perhaps due to the small number of patients (N=8).

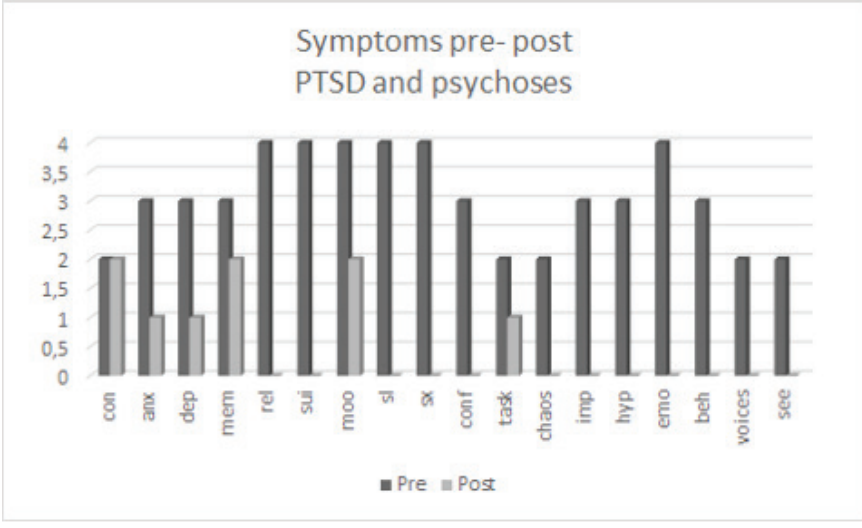
Table 4.18. *Summary statistics of the core symptom network of patients hearing voices*

Voi Pres. Dep NW Symptom	Pearson Corr Dep	Male	Age M, SD	M1, SD	M2, SD	M1-M2	t (df) p	ES
Dep	1	40.00%	46.10, 16.93, 10-59	3.00, 0.82	1.80, 1.14	1.20	4.81(9), 0.001	1.21
Beliefs	.77	36.36%	46.27, 16.08, 10-59	13.82, 4.21	9.91, 4.53	3.91	2.98(10), 0.014	0.89
Anx	.76	36.36%	46.27, 16.08, 10-59	3.00, 0.77	2.36, 1.29	0.64	2.61(10), 0.026	0.60
Mem	.63	22.22%	50.56, 11.72, 22-59	2.78, 0.83	2.44, 1.01	0.33	ns	ns
Moo	.65	40.00%	46.10, 16.93, 10-59	2.80, 0.92	1.90, 0.88	0.90	2.86(9), 0.019	1.00
Task	.63	33.33%	41.17, 20.43, 10-59	2.83, 0.98	1.00, 1.10	1.83	3.38(5), 0.020	1.76
Voi	ns	36.36%	46.27, 16.08, 10-59	2.55, 0.69	0.91, 1.45	1.64	4.50(10), 0.001	1.49

Patient with Post Traumatic Stress Disorder and Schizoaffective Disorder

This case study is described shortly in terms of diagnose, symptom presentation and measured treatment outcome after 5 sessions ReAttach. Patient C, female 59 is diagnosed with Post Traumatic Stress Disorder and Schizoaffective Disorder, suffering from emotion regulation problems and mood swings. Pre-test scores are CSE-R 78 and KKL 33. Post-test scores CSE-R 25 and KKL 7. Reliable improvements with full recovery are measured with both questionnaires. Symptom presentation is shown in **figure 4.16**.

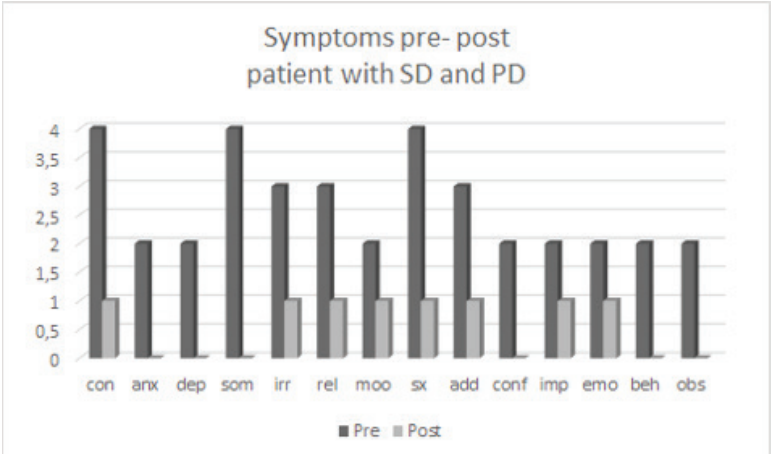
Figure 4.16. *Symptom presentation of patient with PTSD and SD*



Patient with Schizoaffective Personality Disorder and Dependent Personality

This case study is described shortly in terms of diagnose, symptom presentation and measured treatment outcome after 5 sessions ReAttach. A 54 years old female diagnosed with Schizoaffective Personality Disorder and Dependent Personality Disorder participated in 5 ReAttach sessions of a therapist in training. **Figure 4.17** represents the pre- and post CSE-R scores on the presented symptomatology.

Figure 4.17. *Comparison of pre- and post CSE-R scores patient with SD and DPD*



Pre-test scores CSE-R 52 and KKL 19. Post-test scores CSE-R 26 and KKL 13. Reliable improvements with full recovery are measured with both questionnaires.

Conclusion

Results indicate that ReAttach might be beneficial for patients hearing voices and might target a core symptomatology network in this patient group. Results of the core symptomatology network are uncertain. There is a restraint evaluation of effect sizes due to the small number of patients. Single case results of patients with severe psychopathology are optimistic.

Eating problems and addiction from a network perspective

Introduction

Parent's narratives about specific food problems of children with ASD

raise the expectation of overlapping symptomatology comorbidity and between ASD and Feeding and Eating Disorders (American Psychiatric Association, 2013): Anorexia Nervosa, Bulimia Nervosa, Bing Eating Disorder, Avoidant/Restrictive Food Intake Disorder, Rumination Disorder, Pica, Other Specified Feeding or Eating Disorder and Unspecified Feeding or Eating Disorder.

Many individuals with ASD are known to be picky eaters and pathological eating habits are common features in individuals with sensory issues and obsessive compulsiveness. Patients with Orthorexia Nervosa share traits of both ASD and OCS as they have an obsession for proper nutrition and have ritualized patterns of food preparation and eating**.** Food avoidance or restriction might be the result of specific interests and rigid and repetitive behaviour in ASD as well as sensory problems with tactile input, smell or taste (Dell'Osso, 2016).

Overlapping symptomatology has been found between the clinical characteristics of specific Anorexia Nervosa phenotypes and some conditions included in Autism Spectrum Disorders (Dell'Osso, 2016). In 1983, Gillberg suggested that Anorexia Nervosa should be conceptualized as an empathy disorder on the same spectrum as autism (Gillberg, 1983). Longitudinal studies indicate that ASD, recently subsumed by DSM-5 criteria under ASD, indeed was overrepresented in the Anorexia Nervosa population (Dell'Osso, 2016). Other research samples showed that 16% of the adolescents with Anorexia Nervosa had a premorbid diagnosis of ASD (Gillberg 1996) and that 23% of adults with Anorexia Nervosa met the clinical criteria for ASD (Rastam 1992) (Wentz, 2005).

Social isolation

Research with rats has shown that social isolation has a deleterious effect on health. It may result in cognitive deficits such as learning and memory impairment and can induce anxiety and mood disturbances (Famitafreshi, 2016), (Shoji, 2011) (Han, 2011) (Hong, 2011). Isolation of rats for a period of 8 weeks increased the consumption of sucrose (Krupina, 2015). This might be interpreted as a resistance to depressive behaviour (mood disturbance). A plausible explanation is that social isolation activates the need of social reward substitute due to the craving for social activity, connection or bonding. Isolation during addiction imparts devastating effects on the brain, thus socialization of addicts can minimize addiction and improve neurogenesis (Famitafreshi, 2016).

Rats in rich social environments are not likely to become addicts and as far as eating disorder concerns those are not very likely to occur in free and healthy animal populations. It seems that eating disorders and addiction have the feeling, the cognitive bias or the threat of social isolation in common. The cognitive bias of social isolation will likely have the same effect on individuals as real social isolation. Patients may

withdraw from social activities as result of their maladaptive patterns and end up in a self-fulfilling prophesy and self-destructive situation.

Stigma resistance may offer some protection against the internalization of mental illness and eating disorders stigma. (Griffiths, 2015) (Threat of) stigmatization in general activates the schema of social isolation that interacts with the addiction or eating disorder symptomatology (Griffiths, 2015) . Although both group of patients are considerably heterogeneous there is this overlapping maladaptive pattern of social isolation.

Identity problems

Recent research findings suggest that patients with eating disorders experience more identity problems than community controls and those captured by an identity disorder status experience the most problematic psychosocial functioning (Verschueren, 2016). There are negative cognitive biases towards the bodily experience and the self in relation to others and the world.

ReAttach for patients with eating disorders and/or addiction

Eating Disorders and Addiction both are symptoms located in an external locus of control (Lefcourt 1992) and they can be personalised as an external threat that is responsible for their manifestation. Due to high anxiety levels the arousal will not be optimal before treatment and the patient will have problems with the Multiple Sensory Integration Processing. Social Cognitive skills as self-reference and affective mentalization need to be (re)-activated.

Individuals with Eating Disorders and Addiction feel that they are "under pressure". This external pressure will be included in the ReAttach protocol as a significant other, after the (re)training of the mentalization pathway. In the high arousal part the therapist works at the triggers and projects and the cognitive bias modification provides the possibilities towards self-acceptance, compassion and to work at more adaptive coping styles.

Method

To investigate the effect of 5 ReAttach sessions on a group of patients who suffer from eating problems, out of the patients group (N=132), 20 patients with 2, 3 or 4 pre-test scores on hearing voices are selected (male 30.00%, age M=47.80, SD=13.64, range=12-56). Pre-to post treatment comparison of the average CSE-R and KKL scores is shown in **table 4.21**.

To identify the core symptomatology network, intercorrelations of symptoms and beliefs score are reviewed. Self-control has most connections and significant Pearson correlations ($p<0.05$) of self-control and symptomatology are presented in **table 4.19**. To filter out patients

without symptoms, only patients presenting the symptoms at pre-test (2,3 and 4-scores) are selected for each symptom. Selection of patients presenting the symptoms at pre-test (2,3 and 4-scores) filters patients without symptoms. For each symptom group characteristics and pre- to post treatment comparison of mean scores are presented in **table 4.20**.

Table 4.19. *Pre- to post treatment comparison of mean CSE-R and KKL-scores patients with eating problems*

Eating problems	Group							
CSE-R	N=20	30.00%	37.80, 13.65, 12-66	53.45, 15.51	34.00, 16.53	19.45	5.96(19), 0.000	1.21
KKL	N=20	30.00%	37.80, 13.65, 12-66	20.95, 6.37	13.55, 8.08	7.40	5.97(19), 0.000	1.02

Results

Pre- to post treatment comparison of the average CSE-R and KKL-scores are presented in table 19. A significant reduction of psychological distress is measured with CSE-R. The ES of 1.21 is large.

Results show a significant decline of psychological distress measured with KKL. The ES of 1.02 is large. A significant decline of problems with self-control is measured with CSE-R as shown in **table 4.20**. The ES of 2.02 is large. Significant declines of correlated symptoms with this item are found with large ES, varying from 1.33-2.17 except the score on confusion that presents a small, not significant mean difference of 0.50 in a group of 10 patients.

Table 4.20. *Summary statistics of the core symptom network of patients with eating problems*

Eating presented Selfcontrol NW Item	Pearson Correlation Selfcontrol	Male	Age M, SD	M1, SD	M2, SD
SC	1.00	8.33%	40.67, 12.77, 18-56	2.08, 0.29	0.83, 0.83
SI	.58	10.00%	41.10, 12.66, 18-56	2.40, 0.70	1.50, 0.97
Dep	.49	26.67%	40.33, 12.09, 18-56	2.73, 0.70	1.53, 0.83
Som	.48	16.67%	41.00, 13.14, 18-56	2.58, 0.79	1.33, 1.07
Conf	.48	20.00%	39.70, 12.02, 14-56	2.30, 0.48	1.80, 0.79
PTS	.49	12.50%	39.25, 13.07, 18-53	2.63, 0.74	1.00, 0.76
Fati	.46	22.22%	37.50, 14.60, 12-56	3.00, 0.80	2.06, 1.06
Obs	.64	22.22%	42.33, 13.54, 18-56	3.11, 0.60	1.78, 0.97
Eat	ns	30.00%	37.80, 13.65, 12-66	2.35, 0.49	1.15, 0.93

Method

To investigate the effect of 5 ReAttach sessions on a group of patients with addiction problems, 26 patients with 2, 3 or 4 pre-test scores on hearing voices are selected (male 26.92%, age M=45.42, SD=10.53

range=17-63).

Pre-to post treatment comparison of the average CSE-R and KKL scores is shown in **table 4.21**. To identify the core symptomatology network, intercorrelations of symptoms and beliefs score are reviewed. Depression has most connections and significant Pearson correlations ($p<0.05$) of depression and symptomatology are presented in **table 4.22**. To filter out patients without symptoms, only patients presenting the symptoms at pre-test (2,3 and 4-scores) are selected for each symptom. Selection of patients presenting the symptoms at pre-test (2,3 and 4-scores) filters patients without symptoms. For each symptom group characteristics and pre- to post treatment comparison of mean scores are presented in **table 4.22**.

Table 4.21. *Pre- to post treatment comparison of mean CSE-R and KKL-scores patients with addiction*

Addiction	Group							
CSE-R	N=26	26.92%	45.42, 10.53, 17-63	63.77, 16.73	32.46, 18.02	31.31	10.69(25), 0.000	1.80
KKL	N=26	26.92%	45.42, 10.53, 17-63	25.42, 5.85	13.54,8.23	11.88	9.95(25), 0.000	1.67

Results

Pre- to post treatment comparison of the average CSE-R and KKL-scores are presented in **table 4.21**.

A significant reduction of psychological distress is measured with CSE-R. The ES of 1.81 is large.

Results show a significant decline of psychological distress measured with KKL. The ES of 1.67 is large. A significant decline of depression is measured with CSE-R as shown in **table 4.22**. The ES of 2.21 is large. Significant declines of correlated symptoms with depression are found with large ES, varying from 1.20-2.21.

Table 4.22. *Summary statistics of the core symptom network of patients with addiction problems*

Addiction pres. Depression NW Item	Pearson Correlation Depression	Male	Age M, SD	M1, SD	M2, SD	M1-M2	t (df) p	ES
Dep	1.00	29.17%	45.33, 10.97, 17-63	2.92, 0.72	1.25, 1.03	1.67	9.41(23), 0.000	2.21
Anx	0.57	35.00%	46.65, 9.93, 23-63	3.00, 0.73	1.60, 1.19	1.40	5.72(19), 0.000	1.43
Sui	0.56	36.36%	44.09, 10.91, 23-59	2.64, 0.81	0.82, 0.98	1.82	6.14(10), 0.000	2.04
Moo	0.46	21.74%	45.57, 10.95, 17-63	2.78, 0.80	1.70, 1.02	1.09	4.64(22), 0.000	1.20
Task	0.40	31.25%	44.13, 12.81, 17-63	3.00, 0.82	1.56, 0.73	1.44	6.45(15), 0.000	1.87
Chaos	0.59	27.78%	44.17, 12.29, 17-63	3.06, 0.73	1.28, 0.89	1.78	11.66(17), 0.000	2.20
Addiction	0.43	26.92%	45.42, 10.53, 17-63	2.65, 0.75	1.31, 1.29	1.35	7.34(25), 0.000	1.29

Conclusion

Results indicate that ReAttach can be beneficial for patients with eating and addiction problems.

The core symptom network the patient group with addiction problems successfully improved with large effect sizes. The core symptom network of patients with eating problems showed reliable improvement on all symptoms except for the score on confusion that showed a small non-significant positive change.

Psychopathic traits from a network perspective

Introduction

The prevalence of psychopathy is about 0.6% - 1.2% of the general population (Coid, 2009) (Neumann, 2008). Psychopathy can be defined as a constellation of interpersonal, affective, lifestyle and antisocial characteristics (Hare, 1991). Personality features of psychopathy are associated with a socially deviant lifestyle that includes criminal and violent behaviour (Chakhssi, 2012).

Allely and Cooke presented a systematic review of peer-reviewed literature to explore the rate and/or relationship of neurodevelopmental disorders and psychopathy in a forensic sample population (Allely, 2016). They found that some studies have indicated that individuals with ASD are *no more* likely to engage in violent criminal behaviour compared to the general population (Hippler, 2010), and that other studies indicated that individuals with ASD may be *less* likely to engage to do that.

Callous/psychopathic behaviours were found in a relatively small subgroup in a study of 28 boys with ASD on autistic traits, psychopathic tendencies and a variety of cognitive measures (Rogers, 2006).

The researchers didn't find associations of psychopathic tendencies with core autistic cognitive deficits such as problems with executive functioning and theory of mind. These findings indicated impairment of empathic response to distressing stimuli besides the ASD symptoms: a 'double hit' (Allely, 2016) (Rogers, 2006). According Fitzgerald, most individuals with ASD are highly moral but can show aggression of a non-lethal severity. Nevertheless, a small number of persons with ASD do show lethal violence and have been described by Fitzgerald as Criminal Autistic Psychopaths (Fitzgerald, 2010) (Fitzgerald 2015).

In psychopaths, a lack of fear has been proposed as an etiologically salient factor (Hoppenbrouwers, 2016), but there is evidence that psychopathic individuals have deficits in threat detection and responsivity. According Allely et al., the association between psychopathy and ASD needs further exploration aiming the development of appropriate treatment interventions (Allely, 2016). Clinicians are advised to reflect

on overlapping symptomatology of neurodevelopmental disorders such as ADHD and ASD and psychopathy and personality disorders such as antisocial personality disorders (ASPD).

ReAttach guidelines for psychopathic traits

The group of patients with psychopathic traits is diverse in terms of arousal regulation, sensory processing and locus of control. Those patients who show *a pronounced internal locus of control* (Lefcourt 2014) believe that they have the power to control other people and the more extended this believe, the more superiority they will subscribe towards themselves. This can lead to pro-active aggression: goal-directed behaviour designed to achieve an objective beyond verbal, physical or emotional violence.

Those patients who show *pronounced external locus of control* (Lefcourt 2014) believe that they are vulnerable and are more likely to respond with re-active aggression: with hostility driven by an attributional style that perceives hostile intent in others (external threat).

Narcissistic functioning with *grandiose* traits do not suffer from emotion regulation problems in term of emotional lability (Di Pierro, 2017), while the patients with *vulnerable* narcissism have often shown similar emotional impairments as patients with borderline personalities such as emotional lability (Miller, 2010) (Baskin-Sommers, 2014) and *social sensitivity* (Fossati, 2014).

For under-aroused patients with psychopathic traits as callousness and lack of empathy, main priority lies on activation of affective mentalization and limitation of pronounced internal locus of control to reduce pro-active aggression. In narcissistic functioning with grandiose traits there seems to be a gap in development at the symbiotic stage with the parent: a lack of *feeling* connected, loved, attached and belonging, thus the inclusion in the relationship: 'the sense of we'. Differentiating between 'the self' and 'the mother' the child develops internal locus of control *without feeling attached* to her. There is an "I" and there is a "you" but there is no-one special.

Later in development the Theory of Mind enfolds as cognitive skill of perspective taking allowing to *understand* the way other people think or feel. *Empathy* is lacking, Theory of Mind is present and when there is nothing to be scared of and when no-one controls the wish to immediately fulfil the basic needs we have the perfect ingredients to develop a pronounced internal locus of control, manipulation and pro-active aggression.

ReAttach activates the *social reward system* under multiple sensory processing conditions and this might activate attachment in the therapist-patient relationship. It is important that the social cognitive training of ReAttach contains others that might become significant after all, to prevent the therapist-patient relationship to become too exclusive,

perhaps even obsessive since it might be for the first time that this patient will feel connected with anyone.

The affective mentalization prompt demands multiple sensory processing to activate empathy in individuals with empathy deficits: it is about identification with others (including feeling). The identification with others will change the pronounce locus of control because their emotions will be internalised during the ReAttach session.

For under-aroused patients with psychopathic traits it is important to include the concept of power. It is also very beneficial to include the concept empower (giving power to others). Embedding the concept of power in the ReAttach protocol provides the therapist the opportunity to reduces the excitement of controlling others and to introduce the realism of external locus of control. From an orthopaedagogical point of view this is the dilemma that a healthy developing child is facing at the age of 2: sometimes you can control situations and sometimes you cannot. By introducing this dilemma in the ReAttach protocol a balanced locus of control can be obtained.

Patients with psychopathic traits and re-active aggression show a lot of hostility as a respond to potential threats.

They often feel socially excluded and seek social support in gang activities. Some patients suffer from post trauma and suppressed pain and anger with explosive outbursts. Identification with these feelings as part of themselves is possible after working on their biggest threat that can be easily detected in spontaneous interaction.

Working with criminal juvenile patients in forensic settings provided the insight that psychopathic traits might be regarded as a re-active attachment disorder. To achieve optimal (higher) arousal the amygdala is triggered at the start of the session by *a slightly too positive* rather than a neutral respond: being a little bit too nice. This will trigger the schema of mistrust/abuse and the triggered amygdala function activates enough alertness to start a good ReAttach session. To achieve optimal arousal for the CBM-part of ReAttach the prompts will be given in a language that connects with the world of experience of the patient. A secondary goal for these patients is to use CBM2 to activate under-activated emotional skills to learn to connect with significant others, peers and intimate relations. These are new steps that may be frightening for those patients who have been shielding themselves to survive.

ReAttach and behaviour problems

A behaviour problem never comes alone. As a systemic intervention ReAttach reviews behaviour problems in the context of the social environment. Parents and partners are invited to participate in ReAttach sessions and learning to act and communicate in a non-violent way is very supportive.

Early Maladaptive Schema's and Psychopathy

Most current interventions for psychopathy aim at reducing aggressive behaviour and relapse prevention and are based on cognitive-behavioural theories of psychopathology (Hollin, 2006) (Chakhssi, 2012). Research suggests that Early Maladaptive Schemas relating to mistrust, inadequate self-control / low frustration tolerance, and autonomy/dominance, play a role in the impulsive lifestyle and antisocial behaviour characteristics of psychopathy (Chakhssi, 2012). Maladaptive cognitive schemas have proven to be modifiable in a broad range of mental disorders, including externalizing disorders such as substance abuse and borderline personality disorder (Ball, 2007). Early maladaptive schemas of Mistrust / Abuse, Insufficient Self-Control and Subjugation were significantly related to the PCL-R Impulsive Lifestyle and Antisocial facets. These schemas refer to a high level of mistrust and a hostile view in the world in terms of predators and prey (Mistrust / Abuse) to inadequate self-control and low frustration tolerance (Insufficient Self-Control) and to a strong need for autonomy and dominance (the inverse relationship with Subjugation) (Young, 2003) (Chakhssi, 2012).

Treatment interventions focussing on ameliorating these schemas may lead to better outcomes in psychopathic offenders (Chakhssi, 2012). Schema therapy is an appropriate intervention since clinically significant improvements were made after 3 years of Schema Therapy in 66% of the patients (Giesen Bloo, 2006).

Method

To investigate the hypothesis that the ReAttach intervention would ameliorate the schemas Mistrust/Abuse, Insufficient Self-Control and Subjugation, comparison of mean pre- and posttest scores on schema's was conducted with a paired sample T-test:

A sample of 92 individuals with a wide range of psychological problems participated in ReAttach Therapy sessions provided by therapists in training. Informed consent was obtained and before and after 5 therapy sessions the participants filled in the schema-questionnaire YSQ3 (Young, 2003).

Out of 92 patients 84 provided both pre- and post measurements. There were 2 patients who did not fully complete full 5 sessions because they were not motivated to proceed. At the end of the cognitive therapy 6 post tests were missing.

Table 4.23 *Pre- to post treatment comparison on scores of schema domains in a sample of 84*

Young Schema Questionnaire					
YSQ3					
N=84, Male 33.33%					
Age 44.50, 11.60, 18-67					
Schema domain	**M1, SD1**	**M2, SD2**	**M1-M2**	**t(df)p**	**ES**
Mistrust / Abuse	45.89, 15.61	34.24, 12.08	11.65	7.12(83), 0.000	0.83
Insufficient Self-Control	38.40, 12.98	31.15, 11.66	7.25	5.67(83), 0.000	0.59
Subjugation	28.63, 11.27	21.17, 9.16	7.46	6.42(83), 0.000	0.73
YSQ3 totalscore	638.54, 148.70	481.33, 144.45	157.20	9.32(83), 0.000	1.07

Results

Table 4.23 presents the results of the comparison of the mean scores before and after ReAttach on Mistrust/Abuse, Insufficient Self-Control and Subjugation. Significant changes ($p<0.001$) are obtained in all three schemas and effect sizes vary from medium to large (0.59-0.83). Total YSQ3-score showed a significant improvement ($p<0.001$) the effect size of 1.07 is large (Cohen, 1992).

Conclusion

Results indicate that ReAttach contributes to reliable improvement of the schemas that play a role in the impulsive lifestyle and antisocial behaviour characteristics of psychopathy. As these results with large effect sizes were obtained by only 5 sessions ReAttach performed by therapists in training, the results are promising.

Behavioural Problems

Method

To investigate the hypothesis that 5 ReAttach therapy sessions reduce behaviour problems a comparison of mean CSE-R and KKL-scores is conducted with a paired sampled T-test.

Out of the patients group (N=132), 23 patients with 2, 3 or 4 pre-test scores on behaviour problems are selected (male 34.78%, age M=34.13, SD=15.99, range=7-59).

Table 4.24. *Pre- to post treatment comparison of mean CSE-R and KKL-scores patients with behaviour problems*

Behaviour Problems		Male	Age M, SD	M1, SD	M2, SD	M1-M2	t (df) p	ES
Behaviour	N=23	34.78%	34.13, 15.99, 7-59	2.25, 0.45	0.61, 0.84	1.65	9.53(22), 0.000	2.46
CSE-R	N=23	34.78%	34.13, 15.99, 7-59	59.52, 16.58	24.96, 14.41	34.57	13.26(22), 0.000	2.23
KKL	N=23	34.78%	34.13, 15.99, 7-59	21.22, 7.37	9.00, 5.63	12.22	11.70(22), 0.000	1.87

Results

Pre- to post treatment comparison of the average mean CSE-R, KKL and behaviour scores are presented in table 24. A significant reduction of psychological distress is measured with CSE-R. The ES of 2.23 is large (>0.80) (Cohen, 1992). Results show a significant decline of psychological distress measured with KKL. The ES of 1.87 is large (>0.80) (Cohen, 1992) A significant decline of behaviour problems is measured with CSE-R. The ES of 2.46 is large (>0.80 (Cohen, 1992).

Conclusion

Results indicate that ReAttach contributes to reliable improvement of behaviour as a large reduction was found after 5 therapy sessions.

Nervous breakdowns

Introduction

Medical Doctors and Paramedics see a lot of patients with symptomatology fitting in more than one diagnostic category. The complexity of symptomatology in the field of neurorehabilitation or psychogeriatrics requires a biopsychosocial approach. Physical problems impact our well-being as much as psychological problems impact our physical functioning or recovery from traumatic events. Traumatic brain injury has a major influence on the patient, spouse and children and loss of physical abilities can cause major stress, the loss of a job, even the loss of friends. Some patients will eventually end up feeling different and isolated and longing for their 'old lives'. Survivors of breath-cancer often have to deal with fatigue, oedema, physical adaptation, social consequences (being associated with the cancer) and Post Traumatic Stress. A fall on your head with a brain concussion might alarm your fight-and-flight system which will result in a negative stress cycle: you think that you definitely need to rest but instead you feel over-alert, not able to relax or to concentrate on tasks. Patients with conversion and hypochondria experience physical problems and the missing objective medical cause is alarming. Burnout is well accepted as a psychosomatic

problem. Ever-increasing stress is associated with life threatening health consequences and as a result a nervous breakdown or burnout enforces a break from the stress. When too much stress occurs over a long period the ability to compensate physical preparedness of the fight-and-flight system (Sympathetic Nervous System) with the Parasympathetic Nervous System will be lost and you will get exhausted. Recovery demands rest and the decrease of psychological distress and activation of the Parasympathetic Nervous System may be beneficial for patients in neurorehabilitation groups.

Paramedics tend to combine ReAttach with physical exercises to improve treatment outcome in terms of physical functioning. The CBM-part of ReAttach will be used for motor imagery or to improve connectivity with damage areas. The improved Multiple Sensory Processing as a result of ReAttach is immediately used during physical exercise, mirror-training, speech-exercise. The low arousal part of ReAttach is also used for patients with neurodegenerative disorders to recover from fatigue or to stop tremors in deep resting state (Parkinson's disease).

Method

To investigate the effect of 5 ReAttach sessions on psychological distress of patients in neurorehabilitation, 92 patients who provided informed consent were followed. As shown in figure 18 ReAttach was not indicated for 9 patients (below cut off-score). There were 11 patients who dropped out: 4 were not motivated to follow through 5 sessions, 3 couldn't follow through due to other circumstances and 5 patients suffered from another illness that needed treatment instead of ReAttach. Out of 91 patients 71 started the ReAttach procedure and 68 patients provided both pre- and post-tests.

Figure 4.18. *Patient's flow chart neurorehabilitation study*

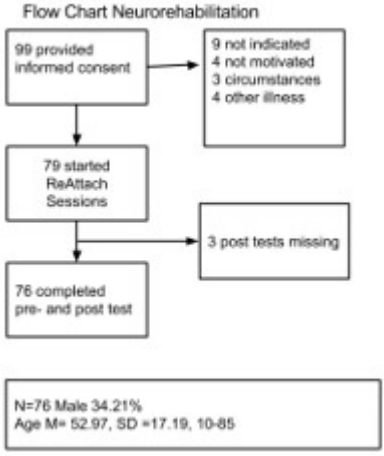


Figure 4.19 shows there were 45 patients categorised with psychosomatic problems, 23 patients with traumatic brain injury and 8 patients with neurodegenerative disorders.

Figure 4.19. *Neuro Rehabilitation Categories*

Table 4.25. *Pre- to post treatment comparison of mean CSE-R and KKL-scores neurorehabilitation*

NeuroRehabiliation		**Male**	**Age M, SD**	**M1, SD**	**M2, SD**	**M1-M2**	**t (df) p**	**ES**
CSE-R	N=68	34.21%	52.97, 17.19, 10-85	49.18, 17.02	27.55, 15.68	21.63	12.49(75), 0.000	1.32
KKL	N=68	34.21%	52.97, 17.19, 10-85	19.39, 6.32	11.25, 6.21	8.14	11.48(85), 0.000	1.30
Psychosomatic		**Male**	**Age M, SD**	**M1, SD**	**M2, SD**	**M1-M2**	**t (df) p**	**ES**
CSE-R	N=45	26.67%	50.00, 14.94, 20-78	49.91, 16.92	27.67, 16.47	22.24	9.55(44), 0.000	1.33
KKL	N=45	26.67%	50.00, 14.94, 20-78	19.62, 6.63	11.16, 6.43	8.47	8.46(44), 0.000	1.30
Traumatic Brain Injury		**Male**	**Age M, SD**	**M1, SD**	**M2, SD**	**M1-M2**	**t (df) p**	**ES**
CSE-R	N=23	39.13%	56.22, 20.48, 10-85	46.91, 16.60	25.87, 16.51	21.04	7.83(22), 0.000	1.27
KKL	N=23	39.13%	56.22, 20.48, 10-85	18.35, 5.54	10.61, 6.68	7.74	7.46(22), 0.000	1.26
NeuroDegenerative		**Male**	**Age M, SD**	**M1, SD**	**M2, SD**	**M1-M2**	**t (df) p**	**ES**
CSE-R	N=8	62.50%	60.38, 17.00, 40-84	51.63, 20.24	31.75, 6.50	19.88	2.89(7), 0.023	1.33
KKL	N=8	62.50%	60.38, 17.00, 40-84	21.13, 6.98	13.63, 2.26	7.50	3.08(7), 0.018	1.45

Results

Pre- to post treatment comparison of the average CSE-R and KKL-scores are presented in **table 4.25**.

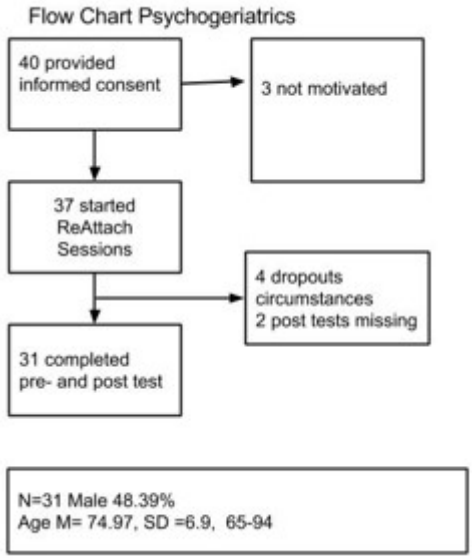
Significant decline of psychological distress is measured with both instruments with large effect sizes.

The group Neuro Degeneration is rather small: N=8. We need to be cautious with the interpretation of the results.

Method

To investigate the effect of 5 ReAttach sessions on psychological distress of geriatric patients 40 patients who provided informed consent were followed. **Figure 4.20** shows that out of 40 patients, 37 started the ReAttach procedure, 4 dropped out due to circumstances and 31 patients provided both pre- and post-tests.

Figure 4.20. *Psychogeriatric patients Flow Chart*



Results

Pre- to post treatment comparison of the average CSE-R and KKL-scores are presented in **table 4.26**.

Significant decline of psychological distress is measured with large effect sizes. Despite the complex clinical presentations of the neurorehabilitation group the majority of these patients (81%) was able to benefit from ReAttach. One patient with psychosomatic symptomatology

reports a reliable deterioration. It remains unclear what exactly has caused the increase of psychological distress, since there are multiple potential causes such as marital problems, problems at work or the gain in terms of attention of the vulnerable social support system.

Table 4.26. *Pre- to post treatment comparison of mean CSE-R and KKL-scores psychogeriatric patients*

Psychogeriatrics		Male	Age M, SD	M1, SD	M2, SD	M1-M2	t (df) p	ES
CSE-R	N=31	48.39%	74.97, 6.90, 65-94	44.06, 14.05	23.52, 13.33	20.55	7.65(30), 0.000	1.50
KKL	N=31	48.39%	74.97, 6.90, 65-94	18.42, 6.16	9.19, 5.73	9.23	7.86(30), 0.000	1.55

Table 4.27. *Reliable change statistics neurorehabilitation groups*

RCI Measurement CSE-R	Reliable deterioration		Uncertain Change		Reliable Improvement not recovered		Reliable Improvement recovered		% moved from above cutoff to below cutoff	
Group	N	%	N	%	N	%	N	%	N	%
Neurorehabilitation N=68	1	1.32	13	17.11	23	30.26	39	51.32	39	51.32
Psychosomatic N=45	1	2.22	5	11.11	14	31.11	25	55.56	25	55.56
Traumatic Brain Inj. N=23	0	0	5	21.74	5	21.74	13	56.52	13	56.52
Neurodegenerative N=8	0	0	3	37.50	4	50.00	1	12.50	1	12.50
Psychogeriatrics N= 31	0	0	6	19.35	7	22.58	18	58.06	18	58.06

Conclusion

These results suggest that the ReAttach intervention may be a beneficial intervention for neuro-rehabilitation patients although patients with neurodegenerative disorders suffer from a progressive condition. The complexity of the clinical condition of these patients and the impact on their families and social support system makes it very hard to find out why some individuals benefit a lot and why other individuals don't.

The study shows that the majority of the neuro-rehabilitation group (81%) was able to benefit in terms of reduction of psychological distress. A reduction of stress supports physical recovery and improves well-being.

More advanced research is needed to fully understand the impact of the ReAttach intervention for this challenging population.

4.7. Discussion

Nuijten et al. suggest using the individual symptomatology network to create tailor made interventions for individuals (Nuijten, 2016). This had led to the idea to use a network perspective to target core symptomatology networks that play a major role in both autism and other clinical neuropsychiatric disorders. This chapter describes how we investigated our attempt to target core symptomatology networks with ReAttach and how we used the same intervention to activate development in a patient population with a broad range of symptomatology, including ASD. The results, although preliminary, are encouraging enough to investigate this further with more advanced research design.

This rises many questions: Is autism treatable? What exactly do we treat? Can we fully lose those symptoms?

Autism may be an array of distinct conditions that may have different genetic and environmental background but produce similar symptoms. The study of this network approach supports the idea that we do not need to simplify the complexity of autism to a single concept to find solutions., nor do we need to simplify other neuropsychiatric conditions. If we approach clinical presentations in their full complexity as sets of symptoms and their interrelations (Nuijten, 2016), we can positively influence interacting symptomatology and activate developmental potential in a broad range of patients with clinical neuropsychiatric conditions.

Targeting symptomatology can be considered as help without stigmatisation. Socialization alone can already reduce symptoms, cognitive deficits and improve neurogenesis regardless of mental symptoms (Famitafreshi, 2016). Maybe the most empowering key in ReAttach is the feeling connected (again) with another human being.

The reduction of impediments makes room for growth:

The personal growth of the individuals with ASD and participants with other neuropsychiatric conditions is a great encouragement for other patients. It replaces discouragement by hope and sheds a new light on the resilience and power that has been waiting inside these individuals to enfold.

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Chapter 5

Autism: genetics or epigenetics?

Alexander B. Poletaev and Boris A. Shenderov

Abstract

Autism is gradually becoming an epidemic. The frequency of birth of children suffering from this disorder today is one case for every 60-80 infants, compared with 1:10000 approximately 40-50 years ago. This confirms that most cases of autism are not associated with disorders of the genome (genetic disease epidemics do not occur) and allows you to think about a progressive deepening of problems of the environment as the basis of the pathogenesis of most cases of autism. Environmental pressure may barely noticeable for an adult, but this could disturb the development of a foetus who is less stable. A variety of environmental factors that may be involved in the pathogenesis of autism (industrial and agricultural pollutants, heavy metals, pathogenic bacteria) may cause persistent changes in the immune system of a pregnant woman. Immune deviations are manifested in the form of changes in the production of biologically active autoantibodies and cytokines. We can assume the same type of final outcomes (equifinality) from the action of different environmental factors, because they all cause similar changes in the production of molecules of autoantibodies and cytokines influencing the development (morphogenesis and functional maturation) of different cells of the foetus. Moreover, transplacental transfer of excess of some maternal autoantibodies of IgG class leads to 're-wiring' of the immune system of the fetus (by mechanisms of maternal immune imprinting), which could be an additional factor in the pathogenesis of autism. It is noted that the environment-induced immune changes are mostly adaptive for the mother; however, for the unborn child, they can often be the factors of pathogenesis. Discuss the possibility of the study of repertoires of maternal autoantibodies for the prediction of normal or abnormal development of the foetus and the birth of the new born with congenital disorders that are not caused by gene defects.

5.1. Introduction

The total incidence of genetic diseases, i.e. diseases based on genetic or chromosomal defects of any kind, is approximately 2-4%. These figures are characterised by a pronounced stability and little change over the decades (Ginter 2003). Accordingly, it is difficult to imagine the possibility of raising the issue of the epidemic of one or another genetic disease. The situation is different in the case of autism.

In the forties of the last century, Leo Kanner and Hans Asperger first described autism as a nosologically distinct rare form of neurological disorders in children (Kanner 1943, Frith 1991). From the forties to the mid-eighties, autism met approximately 4 children out of 10,000. However, by 2000, this rate increased to 67 per 10,000 (Ritvo et al. 1989). In California, where the prevalence of autism is lower than that in the whole of USA, between 1987 and 2003 the increase in the number of autism cases amounted to 634% (Ka-Yuet Liuet al. 2010). According the recent estimates of the Center for control and diseases prevention (CDCP), from 2002 to 2008, there was a 78% increase in the incidence of autism, under the age of approximately one case per 88 children (CDC 2012). Moreover, if initially, in the 70s, 80s, 90s years, the growth of these numbers could be attributed to the increased alertness of parents and teachers, along with some expansion of the diagnostic framework, in recent years, this explanation is not tenable. Continued year-to-year growth of the incidence of autism gives rise to the possibility to the talk about this really being an observed epidemic (Ka-Yuet Liu et al. 2010). Simultaneously, these data suggest against a recently dominant view about autism as a genetic disease and give further support to the epigenetic[1] views on the nature of autism.

Genetic autism

The term 'autism' includes disorders characterised by an array of typical manifestations, the most visible of which is the lack of communication and social interaction, a tendency to behavioural stereotypes and a range of other disorders. Cases of autism can differ substantially in terms of the severity of behavioural (neurological) disorders. A small portion shows outwardly similar behavioural disturbances in children, namely the

[1] The term of EPIGENETICS goes far beyond the phenomenon of methylation of genomic DNA on cytosine. Talking about epigenetic changes, we have to understand any modification influenced on functional activity of the molecules DNA, RNA and proteins. These modifications can be induced by many external influences that do not affect the nucleotide sequence of the genome. Changes can occur at the stages of transcription, translation, or implemented in the form of post-synthetic modifications of protein molecules (phosphorylation, glycosylation, adenylation, acetylation, ubiquitinylation, etc.).

autistic symptoms that accompany a number of clinically defined genetic syndromes that are not quite rightfully referred to as 'genetic autism'. For example, autistic symptoms are typical for approximately 10% of the patients with Down syndrome; however, these symptoms are considered nothing more than a symptom that may occur in some patients diagnosed with 'down syndrome'. Slightly more autistic symptoms observed in patients suffering from tuberous sclerosis (in 15-20% of cases) or the syndrome of Martin-Bell are synonymous with the syndrome fragile X-chromosome (typical 20-40% of patients). Most often, the typical symptoms of autism are observed in the Rett syndrome (more than 90% of patients). It is more correct to consider such cases (with the possible exception of Rett syndrome) from the standpoint of the main diseases, due to a specific genetic syndrome, but not to allocate them in separate forms or subtypes of autism. Along with these, there is the 'pure' genetic autism, which can be identified as a separate nosological form, based on certain genetic defects (Bobylova, Pechatnikova 2013). Perhaps as one of the genetic forms of autism, it is advisable to include Rett syndrome, albeit with some reservations. Rett syndrome is due to the faulty gene MECP2, localised in the X chromosome. The encoded protein binds to the methylated CpG sites, which leads to compaction of chromatin and stable repression of certain genes of the neurons (Hendrich & Tweedy 2003). The Rett syndrome affects girls. Up to 6-18 months, the child develops normally, then there is regression of acquired motor and language skills, seizures; the growth of the head stops, appears typical, aimless, movements of the arms become repetitive, and other changes similar to autism are observed (Yurov 2004).

Overall, genetic autism, apparently should be classified as a separate, fairly rare group of monogenic diseases. The set of such forms a 'family's autism', is not more than 2-3% of all cases of autism and have nothing to do with growing over the last 30-40 years of the epidemic of autism. The epidemic, which is fuelled by epigenetic external factors is introduced into our everyday life in a technological civilisation. Whether the individual is under the influence of such factors or not is in no way determined by the genome.

Therefore, the words of Robert Deth can be repeated: "… the worship of the MYTH that autism is a genetic disease, does a disservice to those who could be successfully treated, and diverts attention from exploring the real causes of disease' (quoted on TreatingAutismPublications http://www.autismtreatment.org.uk/wp-content/uploads/2014/03/Medical-Comorbidities-in-Autism-May-20131.pdf).

In passing, we note that in the North American Amish[2] community,

[2] Living in the USA and Canada, the most conservative followers of the sects of Mennonites ('the Protestant believers'). The Amish consciously reject the 'blessings of civilization', including electricity and running water in the house, various chemicals and drugs used in household and agriculture, abandoning the use of pharmacological drugs, etc.

which essentially rejects the innovations of civilisation, the frequency of autism cases in 2005 did not exceed 1 in 10,000 children; whereas in the whole of USA, this value was 1 case per 166 children according the CDC in 2005 (Olmsted 2015). Features of life of the Amish can hardly influence the frequency of gene mutations and chromosomal abnormalities, but can significantly reduce the risks of exposure to the environment on the conditions of the pregnant body (though not eliminate them completely – we all live on the same planet).

5.2. The single nucleotide polymorphism of genomic DNA and autism

The main tools of evolutionary variability are random, and for the most part, neutral point mutations involve mainly the non-coding region of the genome. Tangible expression of such mutations is so called SNP (Single Nucleotide Polymorphism); this is the result of transitions (replacement of G and T to C), transversions (replacement of G to A and T to C) or deletions of single nucleotides (Conrad et al. 2006).

Using genome wide screening (GWAS), it is possible to identify SNP variants (which are quite numerous), occurring with increased frequency in the genomes of many children with autism (Anney et al. 2012). However, the prognostic significance of these findings is rather small and can hardly be used clinically. The fact is that a randomly occurring single-nucleotide polymorphism only in a small subset of cases can influence the expression of certain macromolecules (e.g., enzyme, receptor, transport proteins). This, in turn, may lead to minimal changes of metabolism, and reduce the overall resistance of the organism to external influences to some extent (usually slightly). It is clear that reducing the general resistance of the organism in the conditions of constant environmental pressure, to some extent, will increase the risk of any disease — from the risk of influenza, to postponing myocardial infarction, and to increasing the probability of the birth of an autistic child. Such reduction of the total resistance refers only to the general nonspecific resistance, and does not imply an increased predisposition to a particular disease.

5.3. Epigenetic autism

Through painstaking analysis of hundreds of articles on autism, published during the period 1971-2010 in the most prestigious medical journals, D. A. Rossignol and R. E. Frye (2012) came to the following conclusions:

Only in 6-15% of the cases, autism is directly related to genetic defects; according to others this is in less than 3% of the cases (TreatingAutismPublications, http://www.autismtreatment.org.uk/wp-

content/uploads/2014/03/Medical-Comorbidities-in-Autism-May-20131.pdf).

In 85-95% of the cases, the development of autism is independent of the defects of the genome and is related to epigenetic factors.

Among the latter, the leading role is played by immune deviations and inflammatory processes. Then follow the toxic effects of the environment, oxidative stress and mitochondrial dysfunction.

Half a century ago, the formation of autism was associated with the infringement of the symbiosis between mother and foetus, difficult childbirth, and with the influence of harmful external factors. All this suggests a multifactorial pathogenesis of the disease (Mahler 1955, Mahler 1958). It is interesting that the results of today's studies confirm these early suspicions, and allow us to return to the old views on a new turn of the spiral.

It would be a mistake to think that epigenetic autism, which we allocate a separate group of inborn disorders to, is not related to the characteristics of the genome of the individual. The formation of autism, its severity, and the manifestations in each case, of course, depend on the individual features of the genome (like all other biological manifestations of our life in the norm, and sickness). These features determine the efficiency of expression of many thousands of enzymes, transport proteins, antibodies and other macromolecules that regulate a lot of intracellular and intercellular events and interactions. In the end, memory and learning, and cognitive function in general, as well as overall energy metabolism, muscle activity or features of digestion are based on the regulation of expression of the molecules encoded in the genome and post-genomic (post-synthetic) modifications caused by external factors to the genome influences.

Epigenetic autism refers to polyfactorial diseases, for which, in addition to a certain genetic background, one must have some environmental influences and factors. It is clear, that information about such influences is not contained in the genome in principle (Poletaev et al. 2014). The role of external factors, the impact of which on pregnant woman, can lead to the formation of an autistic child, can lead to very different environmental hazards. In some cases, these may be heavy metals, in other cases, pesticides or herbicides, in some chronic inflammation, acute infectious diseases and many other external influences. The important or even decisive factor may be the persistent changes in the microbiome of women preparing for pregnancy or already pregnant. Such changes may be due to nutrition deficiencies, abuse of antibiotics or some other poorly studied influences on extremely complex biocenosis, which we habitually and not quite correct call the 'human body' (Shenderov 2014). Characteristically, such outwardly unrelated factors, such as disturbances in the composition of normal (symbiotic) intestinal microflora, or the various toxic environmental factors, or chronic inflammation, or acute

bacterial and viral infections, are characterised by a fundamental feature: the ability to induce a long-lasting change in the immune system of a pregnant woman (Poletaev et al. 2014).

The response of the immune system to any (infectious, toxic) biologically significant impacts to the environment is versatile and results in shifts in the production of many antibodies and cytokines. Therefore, the medium-induced immune changes can simply and reliably detect persistent shifts in the production of many natural autoantibodies (Poletaev 2013) and/or by changes in the serum concentrations of several cytokines (the latter is less easily and reliably due to its high lability and the low concentration of cytokines).

5.4. Critical periods of the foetal development in relation to autism

The timing of embryogenesis and foeto-genesis, accounting for primary interference effects, can play a very important role. Therefore, the development of autism, apparently, is determined by the influences that affect the relatively early stages of the prenatal period, i.e. they are attributable to the critical periods that are important for the formation and further development of many primordial organs and tissues. Perhaps this explains the typical for autistic children the poly-systemic disorders.

In passing, let us note that epigenetic autism should be viewed as a group of inherited, intrauterine emerging multisystem diseases, which affect the nervous system as well as pathological changes in stomach, small and large intestines and other organs of the digestive system; besides, they have frequent changes in the lungs, pelvic organs, kidneys and adrenal glands (Rossignol, Frye 2012; Poletaev et al. 2014). It is therefore not surprising that the mortality from different somatic causes of children with autism is 3-10 times more (depending on severity of autism) or higher than the mortality among children who are not autistic of the same age groups (from TreatingAutismPublications. http://www.autismtreatment.org.uk/wp-content/uploads/2014/03/Medical-Comorbidities-in-Autism-May-20131.pdf). If changes in the organism of pregnant woman start later (if damaging impacts have not been seen in the early, but in more later stages of gestation), this leads to more selective disorders in the developing nervous system and does not affect or has a negligible effect on other organs and systems, critical periods of development, which was completed earlier. For example, some preliminary data suggest that the relatively late effect (for example, flu in the second half of pregnancy) may cause the development of not autism but rather schizophrenia-like disorders.

Regressive autism

Approximately in 25-30% of cases of autism, the parents and paediatricians noted that initially the child's development was almost normal, but later (usually at age 1-2.5 years) suddenly a regression occurred. As a result, during a short period of time, the child loses the majority of previously acquired skills, including verbal communication, and appears to display stereotypic behaviour, and other pathological symptoms. The regression was preceded in most cases by an acute infectious disease, intoxication, or some other external events. If this is so, is regressive autism per se not contrary to propositions about the inherent nature of the disorder?

We believe that this is not a controversy, and the situation is explained by the fact that in some cases a new born can develop almost normally even with certain deviations formed in the prenatal period. Through a variety of compensatory mechanisms until then, he may not have or almost does not have any obvious clinical manifestations. In other words, for a long time, the disease remains hidden, i.e. it is in its latent form. However, this situation is not sustainable, and any additional external event may be the final straw that leads to the failure of compensation, i.e. transfer disease from a hidden (latent) form in a clear, with all its typical manifestations. For this reason, most the children (normally formed and without latent violations) neither the flu or other infectious diseases, almost never lead to regression previously formed social-communicative and language skills. But in the small number of cases of the same factors leading to clinical manifestation of until that, compensated deviations and to 'appearance' of previously undiagnosed, hidden disease.

5.5. The immune system as an interface between Organism and Environment

The immune system, as well as the nervous system is designed to ensure the safety of contacts between the organism and the environment. Both systems are evolutionary adapted to the perception of incoming information, its processing (integration), storing and playback. Both systems accumulate an individual experience (not inherited), and provides a more prompt and adequate reaction of the organism on the repetition of previously meeting incoming signals.

The nervous system is specialised for perceiving and processing the information incoming mainly in the form of signals of physical nature (visual, auditory, mechanical, thermal stimuli). In turn, the immune system responds to the information coming in the form of different chemical stimuli, including viral and bacterial antigens (exogenous), and endogenous, end-products related to the functioning of cells and tissues of the own organism. In other words, the immune system can be

considered as a peculiar interface, mediating the physiological reactions of an organism in response to the chemical factors coming in from the external and internal environment. It is clear that any toxins, pollutants or microbial antigens, long-term supplied to the body in a certain excess, will inevitably cause changes in the immune system of the individual, sometimes very persistent. Range of reactions of the immune system to a variety of chemical factors is rather limited in form. In all cases, these reactions most visibly manifest themselves in changes in the production of cytokines (pro-inflammatory and anti-inflammatory) and antibodies (autoantibodies). At the physiological level, these reactions manifest in the form of the successive phases of the sanogenic process: the development of local inflammation, activation of the ground clearance of the body from the excess of dying cells and potentially harmful exogenous and endogenous products, and in the stimulation of regeneration and functional recovery processes. These immuno-physiological processes are protective (adaptive)in essentially. But in some cases, for example, because deviated regulation, caused by too intense or too prolonged external influences, the originally adaptive immuno-physiological processes turn into its opposite and can become pathogenic ones. Most often, the negative effects of abnormal activation of the immune system is observed in pregnant women with all sorts of unwanted external influences on the fragile systems of the mother and the foetus.

Altered immune reactivity of mother and its influence on the development of a foetus.

It should be noted that the increased serum levels of autoantibodies with different organ and tissue specificity are universal defensive reactions of a human organism, induced by pathological changes of any etiology and any location. Increased production of these molecules provides an activation of the clearance of damaged organs and tissues (Poletaev 2014). Environmental problems characterised by prolonged excessive accumulation in the environment (and therefore in soil, water, food) a variety of toxins and pollutants that can cause pathological changes in different tissues, organs and systems of the human body (Dotsenko 2006). In addition, many pollutants directly influence the state of the immune system, and induce abnormal changes in the production of many cytokines and antibodies. In the situation of pregnancy, we meet with a highly dialectical situation. The mother-foetus system represents a single quasi-organism (Poletaev 2014). Organ and tissue disturbances in the maternal compartment of this quasi-organism, even subclinical, accompanying activation of apoptosis or necrosis, will induce adaptive (with point of view the maternal compartment) increasing of production of autoantibodies according to cellular-tissue specificity (Hare et al. 2013, Poletaev 2014). However, sanogenic immuno-physiological reaction of women organism, which manifested in increased production of autoantibodies of class IgG to antigens in the affected organs and tissues may be pathological, in

relation to the foetus. Especially in cases where enhancement produces 'neuro-tropic', 'pancreas-tropic', 'pulmo-tropic', 'cardio-tropic', etc. autoantibodies, appears excessively long and/or too intense. Chemical pollution of the environment, may be accompanied mostly by a long but not very intense changes in the body. On the contrary, acute infectious diseases may be a cause significantly more short, but more intensive changes in production of different autoantibodies (Poletaev et al. 2007). Under normal conditions, transported maternal antibodies are involved in the pre-programming of the emerging immune system of the unborn child (the phenomenon of maternal immune imprinting (Poletaev 2008; Lemke, Lange 2009). However, one should take into account that the antibodies are biologically active molecules, and prolonged abnormal increase in the production of any of them could cause harm to the foetus.

Features of the reaction of pregnant woman induced by certain pollutants and pathogenic viruses and bacteria, as well as features of the immune response, will largely be determined by the characteristics of the genotype of the individual woman. It is essential to note that this causes changes in production of cytokines, that is highly labile molecules (half-life most of them do not exceed the minutes-tens of minutes) and almost does not penetrated the placenta, are unlikely to be very noticeable to the foetus. In contrast, changes in production and serum content of many autoantibodies, particularly autoantibodies of the class IgG, the half-life of which in vivo amounts to weeks and which actively transported from mother to foetus through the placental barrier may be highly significant (Poletaev 2008). Different persons would create more or less dangerous anomalies in the production of different variants and combinations of antibodies, more pathogenic or less pathogenic in relation to one or another primordial organ of the foetus. Such individual features of reactivity will ultimately determine the outcome of the pregnancy, as well as the degree of compensation or, on the contrary, the clinically manifested decompensation of inborn abnormalities of the future child.

In relation to the pathogenesis of autism, as well as referring to the development of new approaches to its prevention and correction, the main question is, can the effects of toxins, pollutants, infectious agents and other environmental factors involved in the development of autism, be implemented (mostly) through induced changes in the immune system of a pregnant woman? Or immune changes are very important, but only as one of the other important components of the pathogenesis of autism? Obviously, the answer is fundamentally important, not only in academic terms, but also in purely practical terms. The first option of response, prevention and correction of health status of expectant mothers may be mainly targeted to correct the immune system activity. Whereas the second variant of the answer to this question, implies an extensive complex set of additional measures aimed at selective correction of some extra-immune mechanisms, including restoration of certain metabolic links.

In any case, all these corrective measures should be performed before planned pregnancy and be targeted to the most efficient recovery of the parameters of homeostasis-homeorhesis of the woman's organism that are critical in relation to the outcome of the future planned pregnancy.

5.6. Conclusion

The available information does not allow us to make an unambiguous conclusion about the relative contribution of the immune and extra-immune disturbances in the development of autism and requires serious experimental and clinical study. However, the foregoing arguments allow us, as it seems, to assume the following sequence of major events leading to the development of epigenetic autism:

Long-term negative impact of toxic chemical agents and/or infectious antigens on the organism of women of childbearing age.

Induction of persistent immune changes (along with other functional and metabolic changes?)

Pregnancy on a background of previously generated immune changes (variant: induction of the critical immune changes, during the earlier of pregnancy)

Immune-dependent malformation of the brain structures as well as the developmental deviations in other organs and systems of the foetus.

The birth of a child with (a) decompensated, (b) partially compensated, or (c) a latent autism. NB: it must be borne in mind that the clinical manifestation of previously latent disease in children group (c) can be triggered.

Probably, the proposed scheme will require additions and refinements. First, this may relate to the role and significance of extra-immune events (components) in the pathogenesis of autism. However, it is doubtful that the proposed scheme will be fully revised.

The widespread increase in the incidence of autism, acquired in the past 15-20 years, the nature of the epidemic and possibly a pandemic, clearly requires a rapid development of measures of prevention. It is important to understand that any remedial measures, if any, will be directed only to help the victims (even the most effective), and are unlikely to halt the further spread of the epidemic.

We believe that, to date, considerable convincing evidence suggests that the immune system plays an important role in the pathogenesis of autism, and some autoantibodies may be used as molecular markers of this pathology. Accordingly, it is hoped that the specialised immunochemical methods for the analysis of such markers will soon be able to be applied for the mass screening of infants and diagnosis of autism in the first months of a child's life. An equally important task will be organisation of wide screening of women planning pregnancy to identify persons and early correction of persons at risk.

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Epilogue

It is my great honor to write a epilogue for this interesting book *Aspects of Autism*. It is now agreed that autism occurs along a spectrum, with only a few children manifesting the full range of symptoms. The prevalence of Autism Spectrum Disorder is increasing globally worldwide. This book is intended as an introduction to current thinking about the ReAttach treatment method in autism, anxiety disorders and other developmental disabilities. This is not a comprehensive description or guide to ReAttach therapy, but rather one clinical analysis by the authors as an observer and practitioner. Those who choose to dedicate their professional lives to the study of autism do so because of their love for that group of children with disabilities. The authors are talented and versed in the field, and the book reflects their experience and skills. They made a good connection between the treatment of autism clinical pictures and the overlapping symptomatology from a network perspective of clinical neuropsychiatry. The role of genetics and epigenetics as a causative factor in the pathophysiology of the disorder is exhaustively reviewed in the fourth chapter. The book will be of great benefit to parents, psychologists and other professionals who work in this field. It will clearly play an important role in helping to clarify and unify current understanding of autism, and it is hoped this will result in a significant impact on clinical psychiatry as well. I warmly recommend this book to the wide reading audience.

Vladimir Trajkovski, MD, PhD

Full Professor on Autism Spectrum Disorders, Human Genetics, Physiology and Medical Aspects of Disability
President of Macedonian Scientific Society for Autism, Institute of Special Education and Rehabilitation, Faculty of Philosophy, University "Ss. Cyril and Methodius", Skopje, Macedonia